

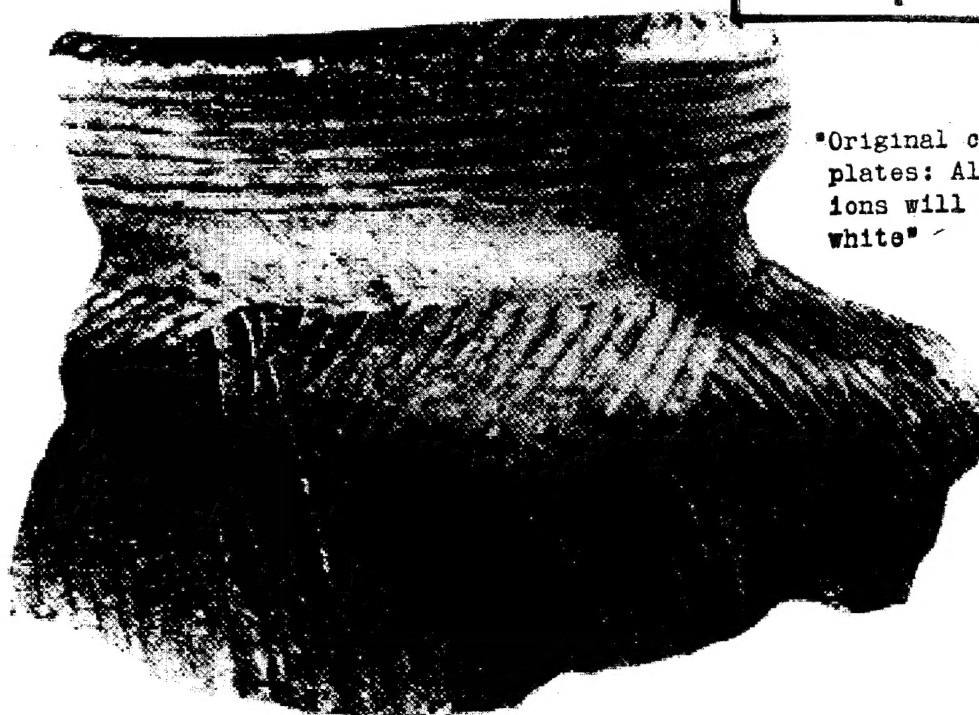
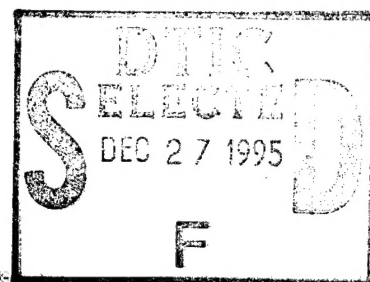


US Army Corps
of Engineers
Omaha District

Archeological Investigations at the Grand Site (39CO1⁴),
Corson County, South Dakota: A Report on the 1984
U.S. Army Corps of Engineers Excavations

September 1995

Volume I - Main Report



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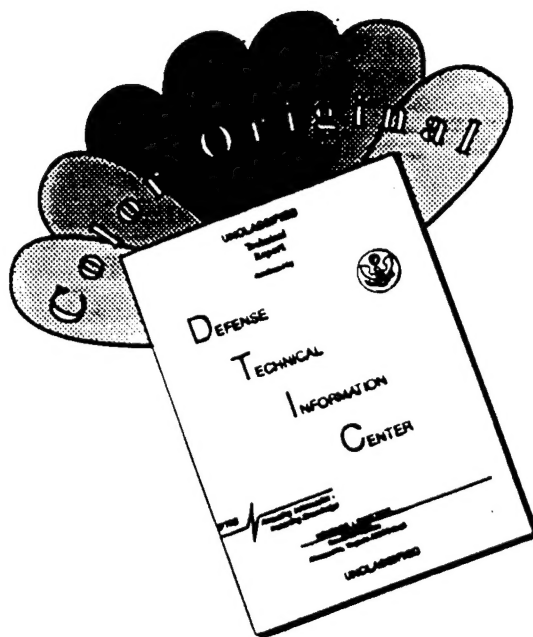
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20. Abstract (cont.)

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ARCHEOLOGICAL INVESTIGATIONS AT THE LOWER GRAND SITE
(39CO14), CORSON COUNTY, SOUTH DAKOTA: A REPORT ON
THE 1984 U.S. ARMY CORPS OF ENGINEERS EXCAVATIONS

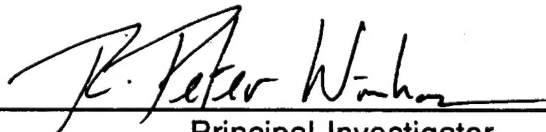
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Holmes Semken, Brent Turnipseed, and Kathy Winham

September 22, 1995

A handwritten signature in dark ink, appearing to read "R. Peter Winham", is written over a horizontal line.

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ABSTRACT

In 1994, the U.S. Army Corps of Engineers contracted with the Archeology Laboratory, Augustana College, Sioux Falls, South Dakota (Contract Number DACW45-94-P-1335), to complete the analyses of recovered materials and a detailed analytical report of the 1984 salvage excavations conducted at the Lower Grand site (39CO14), located near Mobridge, South Dakota. In 1984, the U.S. Army Corps of Engineers undertook the excavation of a series of five cache pits exposed through lake bank erosion along the east edge of the site. The current analyses involved a wide range of cultural materials (ceramics, lithics, faunal and floral samples), and included the submission of two charcoal samples for radiocarbon dating. Dates of 510 ± 80 B.P., and 210 ± 80 B.P. were obtained. The latter date, combined with the ceramic analyses and seriation accomplished on both the 1984 materials and the larger collections from earlier excavations, indicate the site was occupied from approximately A.D. 1525 to A.D. 1575. A summary of previous work undertaken at the Lower Grand site in 1962-1964 and 1969 is also included in this report.

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We also wish to thank the Omaha District, U.S. Army Corps of Engineers Office for their patience in allowing additional time for the completion of a number of aspects of this report. Undertaking the completion of a report on excavations directed by another individual, after a 10-year interval, is not an easy task. However, the process was made less difficult with the slides and photographs provided by the original field director, Timothy Nowak (currently with the Bureau of Land Management in Cheyenne, Wyoming).

Much of the work involved the tedious process of sorting, labeling, cataloging, bagging and boxing the artifacts. Most of this work was undertaken by Cristy Hansen, Christine Gors and Laura Haugen under the watchful eye of Timothy Gillen. Finally, the report is greatly improved by the meticulous editing skills of Lynette Rossum.

INTRODUCTION

by Peter Winham

This report on the analysis of collections from 1984 salvage excavations at the Lower Grand site (39CO14) has been prepared by the Archeology Laboratory, Augustana College (ALAC) [contractor], Sioux Falls, South Dakota, for the U.S. Army Corps of Engineers, Omaha District [sponsor], under Contract Number DACW45-94-P-1335. The purpose of this study is to complete the analysis of the materials recovered in 1984 and to produce a detailed analytical report. In 1984, U.S. Army Corps of Engineers archeologists profiled the eroding cutbank along the east edge of site 39CO14, collected soil samples and excavated five exposed cache pits. The data derived from the 1984 work are integrated with information available from previous investigations at the Lower Grand site.

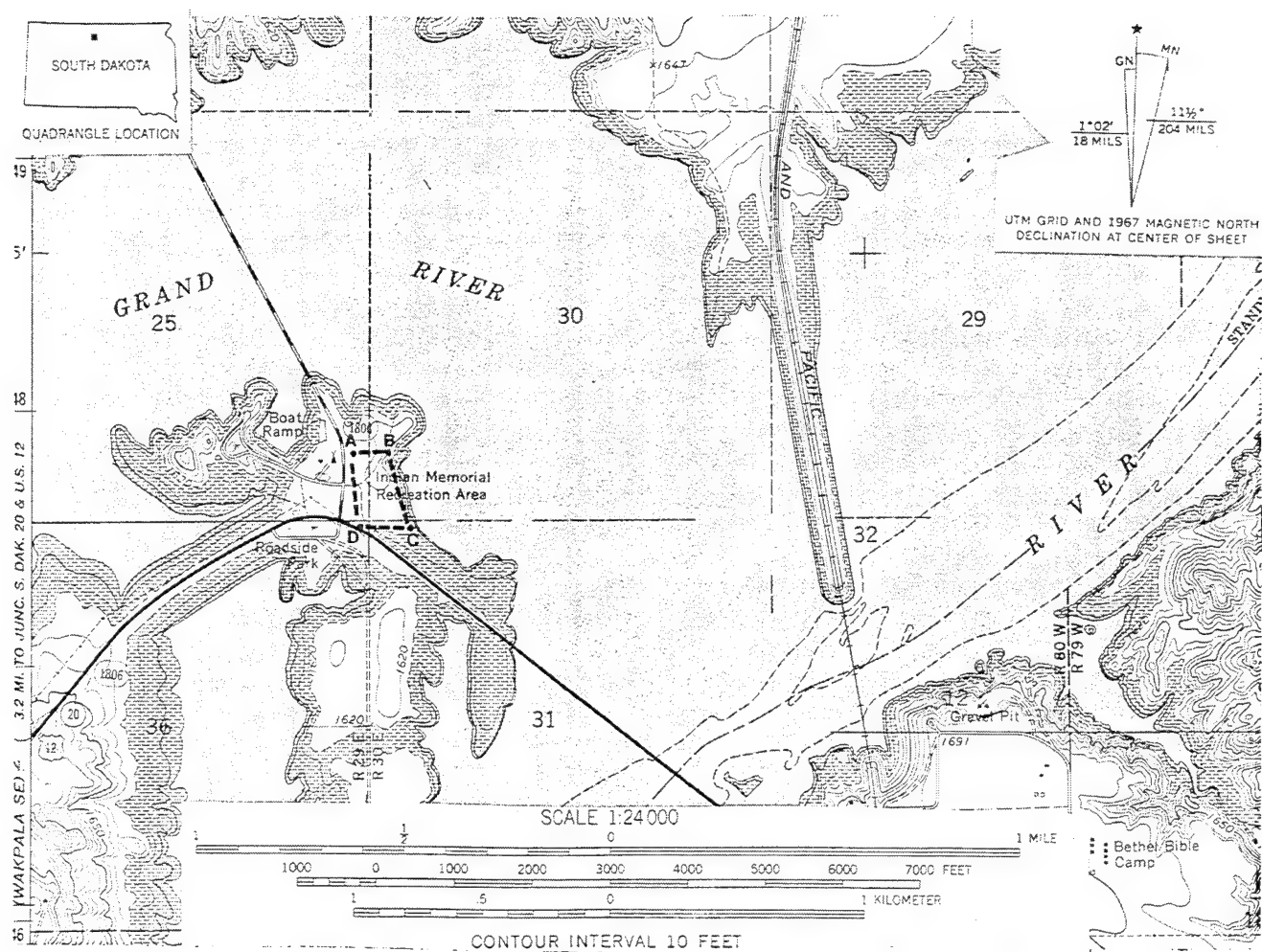
Following completion of the analyses and acceptance of the report, all artifacts will be sent to the South Dakota Archaeological Research Center (SARC) for permanent curation. All of the materials have been processed according to the "Requirements for Submitting a Collection to the State Archaeological Research Center" (SARC, revised September 1994).

This report is organized as follows. First, background information is provided with regard to the 1984 excavations and analyses undertaken prior to the current studies. Next, the specific studies accomplished as part of this contract are described. Finally, specific research questions are discussed and the 1984 data are compared with data from previous investigations at the site.

The Lower Grand, or Davis, site (39CO14) is located on an irregularly shaped remnant of land surrounded by Lake Oahe at the juncture of the Grand River arm of the lake in Corson County, South Dakota (Figure 1; Plate 1). The site was built on a high (ca. 1620 feet elevation), flat, well-drained terrace bench overlooking a meander loop of the Grand River approximately 5000 feet northwest of the confluence of the Grand and Missouri rivers. The site was situated 70 feet above the 2000-3000-foot-wide floodplain of the Grand River prior to inundation of the river. The confluence of Oak Creek and the Missouri River was located a little over 2 miles to the northeast. Mobridge, South Dakota is 2 miles to the southeast, while Wakpala is located 5½ miles to the northwest.

The main site area lies within the 10 acre unit formed by the SW1/4, SW1/4, SW1/4 of Section 30, T19N, R30E, on the Mobridge, 7.5 minute quadrangle (45°34'30" N, 100°29' W). A small portion of the fortified area probably extends into the extreme northwest corner of Section 31, T19N, R30E, the southeast corner of Section 25, T19N, R29E and the northeast corner of Section 36, T19N, R29E.

The site is administered by the U.S. Army Corps of Engineers, Omaha District. The general area is known as the Indian Memorial Recreation Area and offers boating, picnicking, camping and other day use facilities. The 'island' is joined to the west bank of Lake Oahe by an artificial berm by which South Dakota State Highway 12 links Mobridge with Corson County and the Standing Rock Indian Reservation (Plate 2).



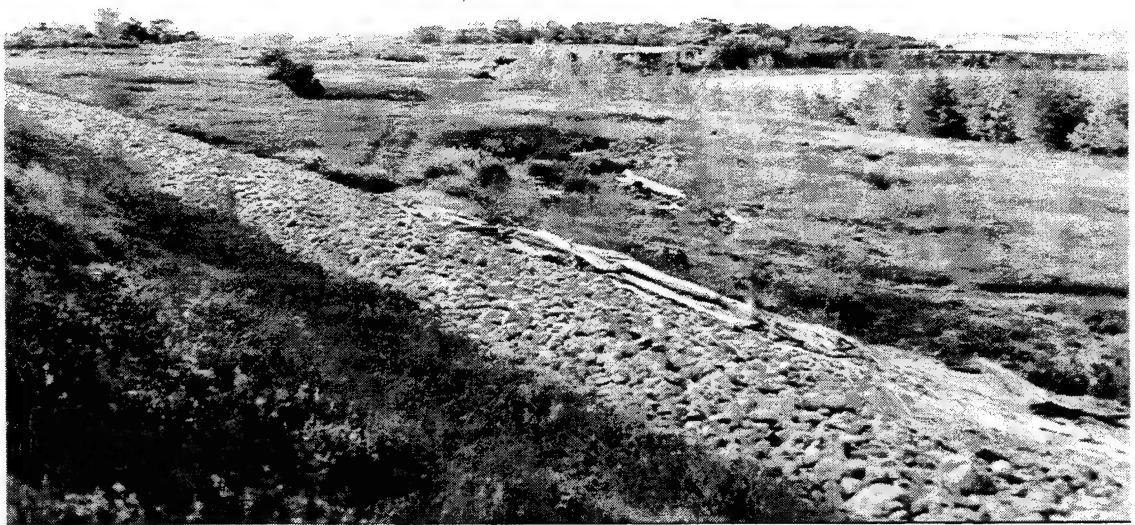


Plate 1. Lower Grand Archeological Site, overview, facing NW.



Plate 2. Lower Grand Archeological Site, overview with North Fortification Ditch in foreground and Highway 12 in background, facing S.

The most comprehensive account of the Lower Grand site is provided by Falk and Ahler (1988). Their report is quoted (in edited form) extensively at the end of this report. Additional sources of site-specific information include the results of a small 1991 cultural resources management (CRM) project conducted by U.S. Army Corps of Engineers archeologist, Richard Berg, on land adjacent to the Lower Grand site (Berg 1991), and on-site observations by Peter Winham (Augustana College) on September 21, 1994.

The Lower Grand site was investigated extensively from 1962-1964 during the Smithsonian Institution's River Basin Surveys program, under the field direction of Alfred Bowers. Work by Alfred Bowers at the Lower Grand site suggested the possibility that two components were represented at the site. This assessment was based on a report of rectangular houses (Bowers 1962, 1963b:118) in association with "Huff-like" pottery, as well as the excavation of a number of circular structures associated with ceramics similar to those found on Chouteau aspect sites (Bowers 1962, 1963a, 1964, 1967). The former characteristic suggested the presence of a Middle Missouri tradition component, while the Chouteau aspect (Stephenson 1954) is generally synonymous with the Extended variant of the Coalescent tradition (Lehmer 1971; Lehmer and Caldwell 1966; also see Hoffman 1967:54-65 for discussion of the Chouteau aspect).

In June 1969, the National Park Service (Midwest Region, Omaha) contracted with the University of Missouri-Columbia to "archeologically explore" the Helb (39CA208) and Lower Grand, or Davis (39CO14), sites, located near Mobridge, South Dakota. Work during the 1969 field season concentrated almost exclusively on the Lower Grand site; one circular structure was completely excavated, limited investigations were conducted in two other structures, and 11 test excavations were placed in widely separated areas of the site (Figure 2). This investigation was carried out under the general direction of Principal Investigator, W. Raymond Wood, during the period June-August 1969. Project design and field implementation were the responsibility of Carl R. Falk, who was assisted by Stanley A. Ahler. At that time both Falk and Ahler were graduate research assistants in the Department of Anthropology, University of Missouri-Columbia. A preliminary report of the 1969 investigation was subsequently completed by Falk and Ahler (1988).

The objectives of the 1969 investigation included the firm definition of temporal and taxonomic boundaries, and a detailed description of basic subsistence patterns and intra-village distribution and consumption of food resources. In contrast to the 1962-1964 investigations, the 1969 investigation employed consistent and systematic artifact recovery techniques and spatial control over the recovered specimens. The 1962-1964 excavations focused on the house as the basic excavation unit with minimal horizontal or vertical controls. Artifacts were recovered using 1/2-inch or 1/4-inch dry screening techniques, and in some cases only those specimens noticed while excavating were collected.

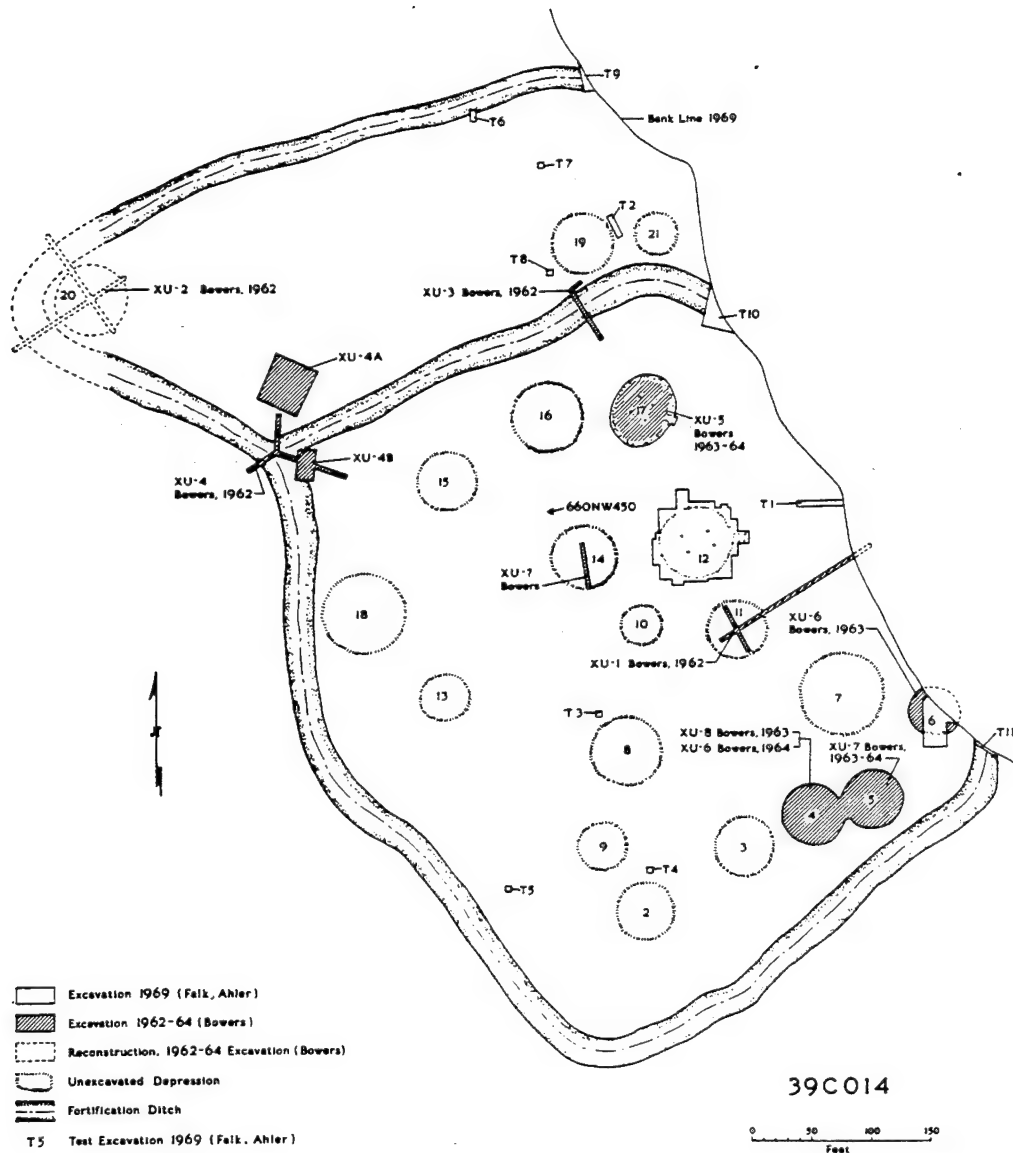


Figure 2. Plan of the Lower Grand Archeological Site showing locations of excavation units (1962-1964, 1969), house depressions and fortification ditches (from Falk and Ahler 1988:Figure 2).

DESCRIPTION OF THE 1984 EXCAVATIONS AND RESEARCH METHODOLOGY

by Peter Winham

Excavation

The records for the 1984 excavations consist of the recovered artifacts and a series of profiles. No field notes were present in the archives provided by the U.S. Army Corps of Engineers. Contacts were made with Timothy Nowak and with Virginia Gnabasik, both of whom participated in the excavation. Some slides of the excavations were loaned to ALAC by Nowak, who also identified the features shown on the photographs. A profile showing a series of spot elevations which presumably relate to the edge of the cutbank was present with the records. However, without reference information (elevation and plan datum points), this record could not be utilized in compiling the current report. No other information was available.

The primary records from the 1984 excavations consist of four profiles labeled Profile 1 (North Fortification Ditch), Profile 2 (Paleosol), Profile 8 (Cache Pits 1-5 and a post/posthole) and Profile 10 (South Fortification Ditch). Plate 3 shows excavations in progress at Cache Pit #3.

Laboratory Analyses

Prior to the current study, the soil samples collected during the 1984 excavations had been water screened and floated (Winham 1989), and general cataloging had been accomplished. The current analyses were undertaken at the Archeology Laboratory, Augustana College, with the following exceptions. The ceramic rim sherds were analyzed by Craig Johnson (Minneapolis, Minnesota); the seed identifications were completed at the South Dakota State Seed Testing Laboratory in Brookings by Brent Turnipseed; the small mammal bone was identified by Homes Semken (Department of Geology, University of Iowa); and the identification of the fish bone and the bird bone was completed by Lynn Alex and John Cordell, respectively (both at the Office of the Iowa State Archaeologist, Iowa City). Specific analytical procedures for each material type are described below.

Background Research

Both Timothy Nowak and Virginia Gnabasik, who had undertaken the 1984 work, were contacted about the current project. Craig Johnson, who was involved in the 1969-1970 studies, also took part in the current study. In addition, the archives at SARC and information on file at ALAC were researched.

Cataloging and Curation

All of the collections from 39CO14 were prepared for cataloging and curating following the "Requirements for Submitting a Collection to the State Archaeological Research Center" (revised September 1994). The site accession numbers are 85-2 (artifacts) and 94-21 (photographic materials).



Plate 3. 1984 excavations in progress at Cache Pit #3.

ANALYSES OF THE 1984 ARTIFACTS

CERAMIC CONTEXTS by Peter Winham

Ceramic materials were present in five contexts and as surface finds. Table 1 correlates the catalog numbers with the contexts.

Table 1. Correlation of Catalog Numbers and Site Contexts for Ceramic Materials.

CATALOG NUMBER	CONTEXT
0	Surface
57 + 58 67	Cache Pit #1 Cache Pit #1 (water screening)
2 + 3 52	Cache Pit #2
44 + 45 70	Cache Pit #3 Cache Pit #3 (water screening)
74 + 75 + 76	South Cache Pit - Profile #6 (=Cache Pit #4?)
86 + 87	North Cache Pit - Profile #6 (=Cache Pit #5?)

BODY SHERDS by Katherine Winham and Peter Winham

The aim of the body sherd analysis was to provide a summary of the recovered materials based on general surface treatment, size and weight of the sherds. The body sherds were first sorted into fragments <1/4-inch and >1/4-inch in size. All fragments >1/4-inch in size were further subdivided on the basis of surface treatment. The categories of surface treatment identified are listed in Table 2.

Table 2. Number of Body Sherds by Type of Surface Treatment.

SURFACE TREATMENT	TOTAL NUMBER OF SHERDS
Incised and/or punctated	13
Cordmarked	13
Brushed	82
Trailed	173
Plain	61
Smoothed Over	389

Most of these categories are self-explanatory and follow surface treatment classes widely recognized in regional ceramic analyses. However, the "Smoothed Over" category was created to include all sherds with some form of surface treatment that had been subsequently nearly obliterated by smoothing. Some researchers would classify these as stamped while others might record them as smoothed (see discussion in Ahler and Swensen 1985:10). Table 3 provides a tabulation of the analysis of the ceramic body sherds.

Table 3. Analysis of Body Sherds from the Lower Grand Site.

CATALOG # 85-2-X	0	2 + 52	44 + 70	58 + 67	74	86	TOTALS
CONTEXT	Surface	Cache Pit #2	Cache Pit #3	Cache Pit #1	South Cache Pit	North Cache Pit	
SURFACE TREATMENT							
Plain #	14	13	2	14	10	8	61
Plain Weight (g)	63.4	23.7	1.1	41.2	24.4	35.6	189.4
Smoothed Over #	47	73	20	100	34	115	389
Smoothed Over Weight (g)	206.4	253.1	29.5	536.8	314.8	773.3	2113.9
Trailed #	27	27	13	56	15	35	173
Trailed Weight (g)	84.8	156.3	23.5	380.5	149.4	331.9	1126.4
Incised #	2	1	4	5	1	0	13
Incised Weight (g)	5.2	0.7	35.3	8.0	1.0	0	50.2
Cordmarked #	4	0	0	3	2	4	13
Cordmarked Weight (g)	14.8	0	0	22.0	16.4	12.5	65.7
Brushed #	8	13	2	12	20	27	82
Brushed Weight (g)	64.5	36.3	8.3	163.4	177.6	207.7	657.8
Fragments #	0	0	6	50	8	15	79
Fragments Wgt (g)	0	0	0.7	12.9	1.6	1.4	16.6
TOTALS #	102	127	47	240	90	204	810
TOTALS Weight (g)	439.1	470.1	98.4	1164.8	685.2	1362.4	4220
Average Weight / sherd	4.3	3.7	2.09	4.85	7.61	6.68	5.21

CERAMIC RIM SHERDS AND DISCUSSION OF THE ASSEMBLAGE

by Craig Johnson

The ceramic assemblage from the Lower Grand site consists of 69 rim sherds and 810 body sherds. The body sherds have been grouped according to decoration and surface treatment (Table 2). Table 3 provides the numbers and weights of body sherds by provenience unit and surface treatment. The rim sherds have been classified according to the wares and types developed by Hurt (1957:36-49) from the multicomponent Extended and Post-Contact Coalescent Swan Creek site (39WW7). A tabulation of the frequencies of these wares and types for the 1984 sample from the site appears in Table 4. Following is a brief description of these classes of rim sherds based on the sample from Lower Grand.

Table 4. Rim Sherds from the 1984 Excavations at the Lower Grand Site.
[Ware/type identifications by Craig Johnson]

WARE/TYPE	CONTEXTS [85-2-#]										TOTALS
	0	3	44	45	57	61	67	75	76	87	
Le Beau Ware: Incised S-Rim (Plate 4d, f)	5	3	1		7					9	25
Le Beau Ware: Horizontal Cord Impressed (Plate 4a-b)	2	1			3					5	11
Le Beau Ware: Cord Impressed								1			1
Le Beau Ware: Miscellaneous Cord Impressed										1	1
Akaska Ware: Nordvold Horizontal Incised (Plate 4c, e, i)	1	2		1	1			3	1	3	12
Akaska Ware: Tool Impressed (Plate 4g, h)	1	3			1		1				6
Akaska Ware: Stab and Drag: Variety A (Plate 4j)				1	1						2
Unidentified	6	2	1			1		1			11
TOTAL	15	11	2	2	13	1	1	5	1	18	69

Le Beau Ware

A number of types are subsumed under LeBeau ware. Unlike many other wares defined from sites in the Middle Missouri subarea, this ware includes vessels which have differing rim forms. Two basic rim forms are prevalent on vessels from Plains Village sites in the subarea: S-shaped or collared and straight or curved. Almost all of the Le Beau ware rim sherds from the Lower Grand site are S-shaped; only one has a straight or curved form. The type which includes these S-shaped forms is termed Le Beau S-shaped Rim (Hurt 1957:37). Within this type are a number of subtypes or varieties, including two of those present at Lower Grand: Incised S-rim, and Horizontal Cord Impressed. A third unnamed type, labeled by Hurt (1957:43) as miscellaneous variations, is also present at Lower Grand. Unlike these three types, the fourth, Le Beau Cord Impressed, has a curved rim form. Le Beau S-shaped Rim types are most commonly associated with Extended and Post-Contact Coalescent components in the Grand-Moreau region.

Le Beau Incised S-rim (25 rim sherds; 36.2% of the assemblage; Plate 4d, f)

All except two rim sherds assigned to this type bear a series of horizontally incised or trailed lines encircling the upper portion of the exterior rim. Two rim sherds are decorated with incised lines which form a series of opposed diagonals encircling the vessels. Lips are round and almost always unthickened and undecorated. The lower portion of the rims is either smoothed, lightly brushed or simple stamped. Five rim sherds are also decorated on the upper rim above the horizontal lines by a series of short tool impressions placed vertically or at a slight diagonal to the plane of the vessel orifice. Several rims bear lugs or short tabular projections on the exterior of the upper rim. Mean lip thickness for 23 rim sherds is 5.35 mm, while the standard deviation is 1.05 mm. The mean thickness of the rim immediately below the lip (lip-rim thickness) is 5.02 mm, with a standard deviation of 0.87 mm (N=25). Mean neck thickness on seven rims is 5.39 mm, and the standard deviation is 0.76 mm. Total rim height on six rim sherds averages 58.5 mm, with a standard deviation of 14.2 mm. Finally, the mean orifice diameter and associated standard deviation are 20 cm and 5.66 cm, respectively (N=6). A description of these measurements can be found in Johnson (1977:Appendix A).

Le Beau Horizontal Cord Impressed (11 rim sherds; 15.9% of the assemblage; Plate 4a-b)

As the type name implies, these are S-shaped rims which have multiple encircling horizontal cord impressions on the upper rim. All rim decoration is applied with a single twisted cord. These rims lack any additional decoration. Lips are usually round and unthickened. Average lip thickness for 11 rim sherds is 5.13 mm and the standard deviation is 1.04 mm. The mean thickness of the rim immediately below the lip is 4.87 mm, with a standard deviation of 0.76 mm. Neck thickness (4.1 mm), rim height (50 mm) and orifice diameter (18 cm) are available from only a single vessel.

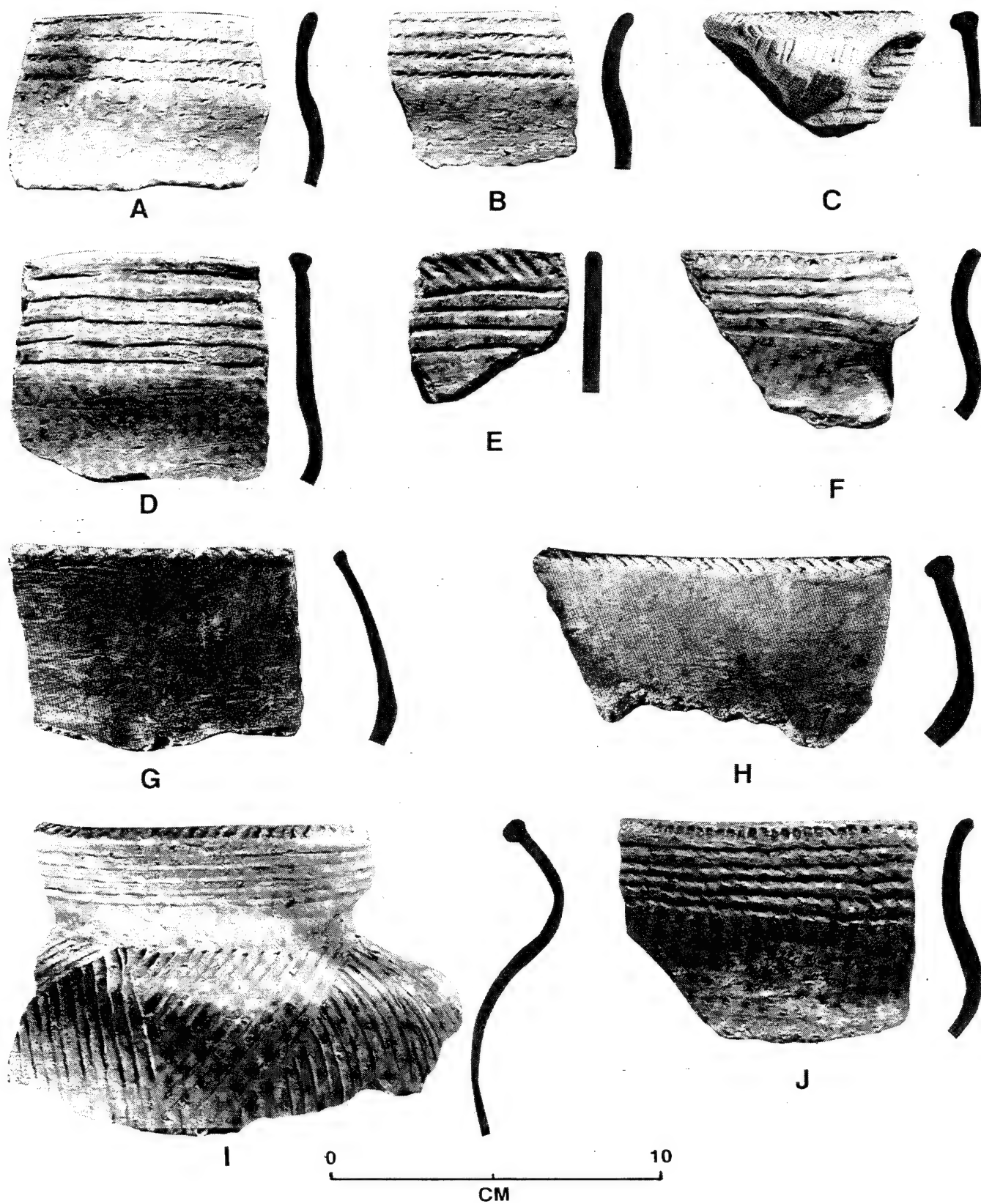


Plate 4. Rim sherds from the Lower Grand site (39CO14). (a-b) Le Beau Horizontal Cord Impressed; (c, e, i) Nordvold Horizontal Incised; (d, f) Le Beau Incised S-rim; (g-h) Akaska Tool Impressed; (j) Akaska Stab and Drag: Variety A.

Le Beau Miscellaneous Cord Impressed (1 rim sherd; 1.4% of the assemblage)

The single rim sherd assigned to this type is a small piece with only a partial motif present. There is a series of parallel cord impressions oriented diagonally to the plane of the vessel orifice or lip, bounded on the top by a single horizontal cord impression. The lip and lip-rim thickness are 4.6 mm and 3.8 mm, respectively.

Le Beau Cord Impressed (1 rim sherd; 1.4% of the assemblage)

This is the only rim sherd assigned to Le Beau ware which has a curved rim form. It is decorated on the exterior rim by a series of horizontal cord impressions, and on the upper portion of the rim and lip by a number of narrow incisions or tool impressions. It is also decorated on the shoulder by a series of opposed diagonally incised lines forming triangular plats. This small vessel has a lip thickness, lip-rim thickness and neck thickness of 3.7 mm, 3.7 mm, and 3.0 mm respectively. Its rim height is 26 mm and it has an orifice diameter of 8 cm.

Akaska Ware

This is the second and last ware Hurt defined from the Swan Creek site. Included within it are four types, most of which possess straight or curved rim forms. Only Akaska Stab and Drag: Variety A is characterized by S-shaped rims. Akaska ware is most often associated with Extended Coalescent occupations in the Grand-Moreau region.

Nordvold Horizontal Incised (12 rim sherds; 17.4% of the assemblage; Plate 4c, e, i)

Vessels assigned to this type are characterized by straight or curved rim forms decorated on the exterior rim by a series of horizontally trailed or incised lines encircling the vessel. Nine of the rim sherds also bear tool impressions on their lips while three are undecorated. One rim sherd has a strap handle while another bears a series of parallel diagonal lines on its shoulder arranged in an opposed triangular motif. Most lips are round to flat with some being slightly thickened. Mean lip thickness for 11 rims is 5.49 mm, with an associated standard deviation of 0.91 mm. The average thickness of the rim immediately below the lip is 4.73 mm, with a standard deviation of 0.60 mm. Only one rim is complete enough to permit a measurement of neck thickness (3.8 mm) and rim height (37 mm). Orifice diameter of three rim sherds averages 17 cm, with a standard deviation of 5.3 cm.

Akaska Tool Impressed (6 rim sherds; 8.7% of the assemblage; Plate 4g-h)

These rims possess straight or curved rim forms, lack decoration on the exterior rim, and bear punctates, slashes or other tool impressions around the lip in single rows or chevron motifs. Lips are often thickened on the interior, exterior or both sides, resembling L- or T-shaped forms. Mean lip thickness is 7.93 mm, with a standard deviation of 2.22 mm. Thickness at the lip-rim juncture averages 5.48 mm, with a standard deviation of 1.18 mm. Neck thickness and rim height on two rim sherds average 8.15 mm and 50.5 mm, respectively. The average orifice diameter of two rim sherds is 24 cm.

Akaska Stab and Drag: Variety A (2 rim sherds; 3.0% of the assemblage; Plate 4j)

These two rim sherds exhibit S-shaped rim forms and are decorated on the upper portion of the rim exterior by a series of stab and drag or push-pull tool impressions. On one rim these are oriented in a series of parallel lines encircling the rim, while on the other they are arranged in a series of diagonal lines around the rim. Lips are characteristically round and undecorated. Mean lip thickness and rim thickness are 5.1 mm and 4.75 mm. The values of neck thickness (4.4 mm) and rim height (61 mm) could be ascertained for only one rim sherd.

Unidentified Rim Sherds (11 rim sherds; 15.9% of the assemblage)

These rim sherds are too fragmentary to permit their classification into previously defined types. As a whole, they bear some of the same attributes which appear on the other rim sherds from the site.

Cultural-Historical Assessment

The rim sherds recovered from the 1984 excavations at the Lower Grand site can be used in conjunction with those from earlier excavations to allow us to place the site within the broader context of Plains Village developments in the Middle Missouri subarea of the Plains. The percentages of the pottery types from the 1984 excavations are similar to those from the larger sample from the site recovered in 1962-1964 and in 1969 (see Johnson 1988). The Lower Grand site is an Extended Coalescent village which, like many other similar sites in the Grand-Moreau region, contains relatively large numbers of vessels with S-shaped rims decorated on the exterior rims by cord impressions and incisions. Although some of the pottery resembles that found in Terminal Middle Missouri and Heart River complex villages (e.g., cord impressed rims), it does not meet the more specific criteria for inclusion within the types associated with them. Rather, the ceramics from the Lower Grand site appear to represent a local Extended Coalescent expression common to these sites in the Grand-Moreau region influenced by the Heart River complex of the lower Knife-Heart region.

A reassessment of the chronological position of the Lower Grand site was recently undertaken as part of a large project to refine the Plains Village chronology in the Middle Missouri subarea (Johnson 1994). A ceramic seriation in conjunction with four new radiocarbon dates places Lower Grand in the sixteenth century. More specifically, the site appears to represent one of a number of late Extended Coalescent villages inhabited around A.D. 1525-1575 prior to the beginning of the Post-Contact Coalescent variant. It appears to have been contemporaneous with the earliest occupation at Swan Creek which continued to be inhabited into the Post-Contact period. The Lower Grand villagers and other late Extended Coalescent peoples in the Grand-Moreau region appear to have coalesced into the Swan Creek (39WW7) and Anton Rygh (39CA4) sites, which were occupied until ca. A.D. 1650-1700 when the Arikara began to emerge as a tribal entity during the protohistoric period.

PREVIOUS STUDIES OF CERAMIC MATERIALS FROM THE LOWER GRAND SITE
(summarized from Falk and Ahler 1988:66-67)

Materials recovered during the 1962-1964 investigation of the Lower Grand site were examined by Ehrenhard in 1972-1973 and a preliminary description was completed (Ehrenhard 1973). Approximately 1200 vessels were defined and examined along with ca. 7000 body sherds. Ehrenhard identified two dominant rim forms: "...straight rims characterized by Talking Crow Ware and S-curved rims, usually of the Le Beau variety" (Ehrenhard 1973:13). Other identified forms included small numbers of braced, collared and inverted rims. Based on his preliminary analysis, Ehrenhard concluded that the Lower Grand site was "...suggestive of a site representing a transitional occupation...in the late Extended Coalescent period..." which showed "...effects of contact with Post-Contact Coalescent groups."

A more ambitious study of the ceramic assemblage from Lower Grand was initiated by F. A. Calabrese (National Park Service, Midwest Archeological Center) in 1974. Project goals included consideration of intra-site and inter-site variability and definition of ceramic groups which could be related to previously defined wares and types. However, prior administrative commitments precluded completion of this work.

In the spring of 1980, Craig M. Johnson initiated another study of the Lower Grand site assemblage in conjunction with his planned doctoral program at the University of Missouri-Columbia. Approximately 4300 ceramic vessels are represented in the combined Lower Grand assemblage; Johnson has recoded data on all specimens, conducted an intensive program of interprovenience matching in an attempt to link spatially discreet units within the site and completed a preliminary evaluation of the rim sherd sample.

Johnson (1988) provides a preliminary evaluation of the sample through a description of ongoing work and a tabulation of frequency data for previously defined ceramic groupings. Johnson's preliminary comparison of percentages of pottery types from Extended Coalescent and Felicia phase (Post-Contact Coalescent) components, which includes the Walth Bay and Lower Grand sites, suggests the following: (1) the Lower Grand and Walth Bay sites are generally similar in terms of traditional ceramic groupings and resemble materials from the Extended Coalescent Spiry site (Baerreis and Dallman 1961), as well as from a number of Extended Coalescent components located to the south in the Grand-Moreau, Bad-Cheyenne and Big Bend regions (Rosa B, Hosterman, Payne, Meander, Fry A, Swan Creek); (2) Walth Bay and Lower Grand appear to fall chronologically somewhere between early Extended Coalescent components (e.g., Molstad, Potts, No Heart Creek) and the Post-Contact Coalescent Felicia phase components (e.g., Cadotte, Two Teeth) -- i.e., A.D. 1500; (3) the pottery from Lower Grand is not a "typical" Extended Coalescent assemblage, but appears to represent an admixture of Extended Coalescent, Extended/Terminal Middle Missouri, and Heart River phase ceramic traits, raising the possibility that Lower Grand and other Extended Coalescent components assigned to the Lower Grand focus by Bowers (1948) may have been occupied by ancestral Awigaxa Mandan

as Bowers suggested; and (4) the ceramics from Lower Grand, in addition to those from Walth Bay and other Extended Coalescent components located in north-central South Dakota, may be related to Scattered Village complex (A.D. 1400-1525) assemblages in the Knife-Heart region of central North Dakota.

LITHIC DEBITAGE

by L. Adrien Hannus and Timothy V. Gillen

All lithic debitage from the 1984 excavations at the Lower Grand site was sorted by material type and size graded by hand using a template with circles drawn at the following sizes: 2 inches/50.8 mm; 1 inch/25.4 mm; 0.5 inch/12.7 mm and 0.223 inch/5.6 mm (see Appendix H). The size grades are defined as follows:

- Grade 0 - greater than 2 inches/50.8 mm
- Grade 1 - greater than 1 inch/25.4 mm and less than or equal to 2 inches/50.8 mm
- Grade 2 - greater than 0.5 inch/12.7 mm and less than or equal to 1 inch/25.4 mm
- Grade 3 - greater than 0.223 inch/5.6 mm and less than or equal to 0.5 inch/12.7 mm
- Grade 4 - 0.223 inch/5.6 mm or less

Debitage was examined under a hand lens to determine if additional modification was present. Modified items are described separately. All unmodified debitage is summarized below. The debitage was first divided by material type, then separated into heat-treated and non heat-treated categories, and finally, sorted by major flake types, i.e., primary, secondary, tertiary, and bifacial thinning flakes (Tables 5 and 6). The few shatter pieces present are included in the primary, secondary and tertiary flake categories.

The following definitions were utilized for flake types:

- | | |
|---------------------------------|--|
| <i>Primary Flakes</i> | Decortication flakes having over 50 percent cortex but few, if any, negative flake scars on the dorsal surface. |
| <i>Secondary Flakes</i> | Decortication flakes having up to 50 percent cortex and negative flake scars on the dorsal surface. |
| <i>Tertiary Flakes</i> | Flakes exhibiting negative flake scars on the dorsal surface, but no cortex. |
| <i>Bifacial Thinning Flakes</i> | As defined for thinning flakes, these flakes exhibit platform preparation, but also a strongly concave ventral surface and an acute platform to ventral surface angle. |

Table 5. Results of Lithic Debitage Analysis: Number of Flakes by Flake Type and by Size Grade for all Debitage.

ALL DEBITAGE	SIZE GRADES						
Flake Type	0	1	2	3	4	T	%
Primary	5	35	12	0	0	52	P
Primary Heated	17	38	8	0	0	63	13.9
Secondary	7	66	15	0	0	88	S
Secondary Heated	12	30	12	0	0	54	17.2
Tertiary	3	107	59	19	11	199	T
Tertiary Heated	25	92	28	0	0	145	41.6
Bifacial Thinning	0	51	72	20	25	168	BT
Bifacial Heated	0	28	6	12	11	57	27.2
						826	

Table 6. Results of Lithic Debitage Analysis: Numbers of Flakes by Flake Type, by Size Grade, and Raw Material Type (Quartzite, Tongue River Silicified Sediment [TRSS], Chert, Brown Chalcedony, Chalcedony, Silicified Wood).

QUARTZITE	SIZE GRADES					
Flake Type	0	1	2	3	4	T
Primary	2	1	0	0	0	3
Primary Heated	0	0	0	0	0	0
Secondary	0	2	0	0	0	2
Secondary Heated	0	0	0	0	0	0
Tertiary	0	13	7	3	5	28
Tertiary Heated	0	0	0	0	0	0
Bifacial Thinning	0	8	2	0	0	10
Bifacial Heated	0	0	0	0	0	0

TRSS	SIZE GRADES					
Flake Type	0	1	2	3	4	T
Primary	1	15	3	0	0	19
Primary Heated	17	38	8	0	0	63
Secondary	5	50	7	0	0	62
Secondary Heated	12	28	11	0	0	51
Tertiary	3	71	24	0	0	98
Tertiary Heated	25	88	27	0	0	140
Bifacial Thinning	0	40	59	20	25	144
Bifacial Heated	0	27	6	12	11	56

Table 6 (cont.)

CHERT	SIZE GRADES					
Flake Type	0	1	2	3	4	T
Primary	1	6	1	0	0	8
Primary Heated	0	0	0	0	0	0
Secondary	0	1	3	0	0	4
Secondary Heated	0	2	0	0	0	2
Tertiary	0	2	4	5	0	11
Tertiary Heated	0	4	1	0	0	5
Bifacial Thinning	0	1	0	0	0	1
Bifacial Heated	0	0	0	0	0	0

BROWN CHALCEDONY	SIZE GRADES					
Flake Type	0	1	2	3	4	T
Primary	0	5	2	0	0	7
Primary Heated	0	0	0	0	0	0
Secondary	2	3	1	0	0	6
Secondary Heated	0	0	0	0	0	0
Tertiary	0	6	4	3	2	15
Tertiary Heated	0	0	0	0	0	0
Bifacial Thinning	0	0	1	0	0	1
Bifacial Heated	0	0	0	0	0	0

CHALCEDONY	SIZE GRADES					
Flake Type	0	1	2	3	4	T
Primary	0	3	5	0	0	8
Primary Heated	0	0	0	0	0	0
Secondary	0	7	4	0	0	11
Secondary Heated	0	0	1	0	0	1
Tertiary	0	9	14	7	4	34
Tertiary Heated	0	0	0	0	0	0
Bifacial Thinning	0	2	10	0	0	12
Bifacial Heated	0	1	0	0	0	1

Table 6 (cont.)

SILICIFIED WOOD	SIZE GRADES					
Flake Type	0	1	2	3	4	T
Primary	0	5	1	0	0	6
Primary Heated	0	0	0	0	0	0
Secondary	0	2	0	0	0	2
Secondary Heated	0	0	0	0	0	0
Tertiary	0	3	6	1	0	10
Tertiary Heated	0	0	0	0	0	0
Bifacial Thinning	0	0	0	0	0	0
Bifacial Heated	0	0	0	0	0	0

Less than five flakes each of jasper, gabbro, and Sioux quartzite were also present in the assemblage. In addition, 67 microflakes weighing 4.6 g were recovered from soil samples processed from Cache Pit #1, and 34 microflakes weighing 2.0 g were recovered from soil samples processed from Cache Pit #3.

CHIPPED STONE TOOLS by L. Adrien Hannus

Projectile Points

A total of eighteen projectile points or projectile point fragments were present in the 1984 assemblage (Plate 5). Tables 7 and 8 provide morphological data and other information (raw material, color, cultural/techno complex) for the points. The discriminate dimensions recorded are based on the earlier work of Ahler (1971) and are utilized here as a means of standardizing the data reported.

Table 7 lists the following attributes for each individual projectile point specimen: stem form, base form, shoulder form, notch type and blade form. These attributes are graphically represented in Figure 3. Some or all of these attributes may not be assignable to incomplete specimens. In addition, the lithic raw material type, item description and color (derived from Munsell color charts) are presented in the last two columns.

Table 8 provides a series of measurements for each projectile point specimen. The measurements taken are graphically illustrated in Figure 4. As defined by Ahler (1971), these measurements can be described as follows. Total length (A) is measured perpendicularly from the baseline to the distal blade tip. Basal contact width (B) is the maximum distance between points of tangency on the baseline. Basal center point length (C) is the distance from the baseline to the basal haft element margin, measured along the centerline. Proximal haft element width (D) is the distance between the two points, one on each lateral haft element margin, most proximally positioned and at which the orientation of the lateral haft element margin is most nearly parallel to the centerline, measured parallel to the

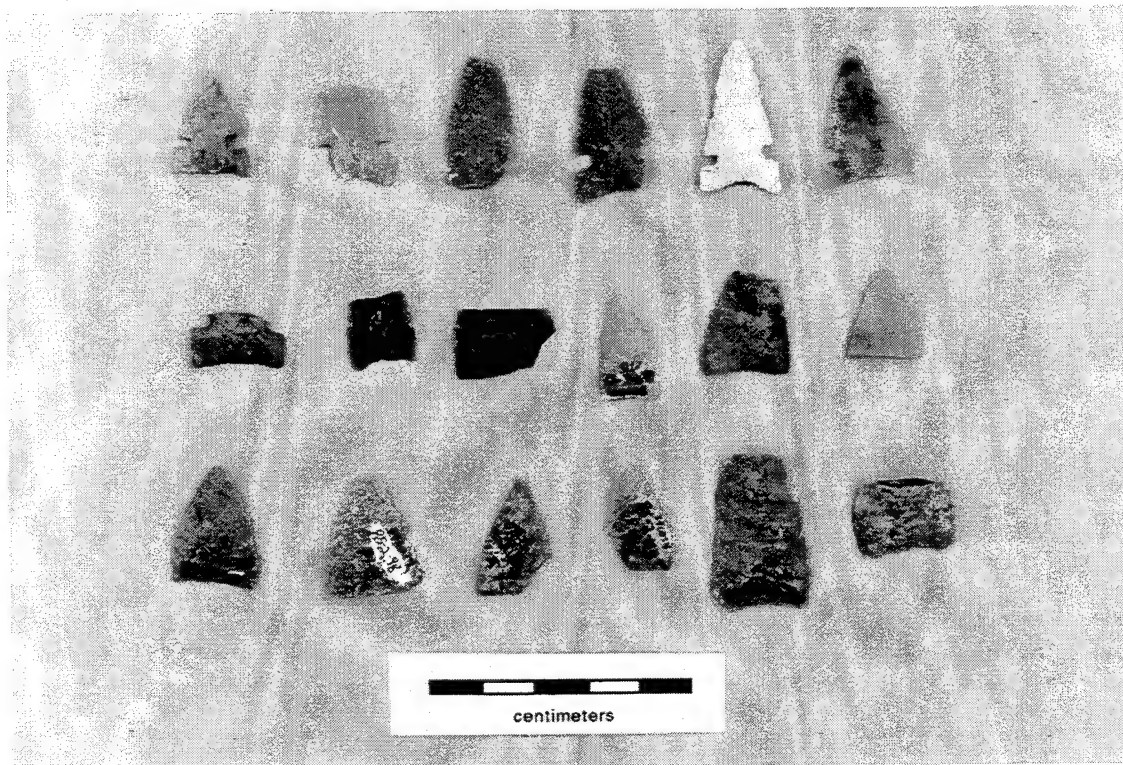


Plate 5. The Lower Grand site: projectile points (l-r: top 1-6; middle 7-12; bottom 13-18).

Table 7. Summary of Form Observations and Material Type for Projectile Points from the Lower Grand Site.

P#	CAT #	CONTEXT	STEM FORM	BASE FORM	SHOULDER FORM	NOTCH TYPE	BLADE FORM	MATERIAL TYPE	DESCRIPTION/COMMENT
1	62	Cache Pit #1	1	3	3	1	1	TRSS	Plains side-notched, complete 7.5YR-6/1 gray
2	110	Cache Pit #1?	1	1	3	1	1	Fine grained quartzite	Plains side-notched, incomplete 10YR-6/2 light-brownish gray
3	111	Cache Pit #1?	1	1	3	1	2	Agatized chert	Plains side-notched, incomplete 10YR-5/6 yellowish brown
4	54	Cache Pit #1?	1	1	3	1	1	Fine grained quartzite	Plains side-notched, incomplete 10YR-4/2 dark grayish brown
5	14	Cache Pit #4	1	1	3	1	1	Chert	Plains side-notched, complete 10YR-8/2 very pale brown
6	13	Cache Pit #4	1	3	3	1	1	Chalcedony	Plains side-notched, complete, translucent
7	15	Cache Pit #4	1	1	---	1	---	TRSS	Basal portion, Plains side-notched 2.5Y-5/1 gray
8	106	Cache Pit #1	0	1	0	0	2	Brown chalcedony	Base, mid-section, Plains unnotched 7.5YR-3/4 dark brown
9	105	Cache Pit #1	0	3	0	0	1	Brown chalcedony	Basal portion, Plains unnotched 10YR-2/2 very dark brown
10	16	Cache Pit #4	0	3	0	0	2	Agatized chalcedony	Plains triangular unnotched 10YR-7/1 light gray
11	107	Cache Pit #1	0	1	0	0	1	TRSS	Base, mid-section, Plains unnotched 10YR-4/1 dark gray
12	17	Cache Pit #4	---	---	---	---	1	TRSS	Distal tip 10YR-6/2 light brownish gray
13	18	Cache Pit #4	0	1	0	0	2	TRSS, heat treated	Plains triangular unnotched 5YR-5/3 reddish brown
14	98	Cache Pit #5 (North)	0	3	0	0	2	Quartzite	Plains triangular unnotched 5YR-5/2 reddish gray
15	112	Cache Pit #1?	0	3	0	0	1	TRSS	Plains triangular unnotched, incomplete 10YR-5/1 gray
16	113	Cache Pit #1?	0	3	0	0	2	TRSS	Plains triangular unnotched, incomplete 10YR-7/1 light gray
17	6	Cache Pit #2	0	1	0	0	1	TRSS	Plains triangular unnotched, incomplete 10YR-5/2 grayish brown
18	12	Cache Pit #4	0	3	0	0	2	TRSS	Plains triangular unnotched, incomplete 2.5Y-5/1 gray

----- unobtainable

Table 8. Summary of Measurements and Cultural/Techno Complex for Projectile Points from the Lower Grand Site.

SPECIMEN P.	MEASUREMENTS (mm)											CULTURAL/TECHNO COMPLEX	
	A	B	C	D	E	F	G	H	I	J	K		L
1	2.20	8.40	n/a	14.50	n/a	8.20	5.70	12.10	8.00	14.50	8.00	2.80	Plains side-notched
2	17.70	---	1.60	---	n/a	8.50	6.52	15.50	8.52	15.50	8.52	2.80	Plains side-notched
3	25.30	---	n/a	---	n/a	9.32	4.40	12.50	5.75	12.50	5.75	3.20	Plains side-notched
4	25.30	---	2.70	---	n/a	8.40	7.70	---	9.25	---	9.25	3.25	Plains side-notched
5	29.20	9.01	2.31	15.50	2.50	8.70	7.70	13.30	9.50	13.30	9.50	3.50	Plains side-notched
6	28.50	8.80	n/a	15.20	n/a	7.45	6.10	13.30	7.65	13.30	7.65	3.15	Plains side-notched
7	10.80	9.60	n/a	17.20	n/a	11.10	8.50	---	10.70	---	10.70	2.80	Basal portion, Plains side-notched
8	13.70	8.10	n/a	12.50	n/a	n/a	n/a	12.80	n/a	12.80	n/a	2.50	Base, mid-section, Plains unnotched
9	14.20	10.90	n/a	---	n/a	n/a	n/a	19.60	n/a	19.60	n/a	3.50	Basal portion, Plains unnotched
10	22.50	6.70	n/a	10.90	n/a	n/a	n/a	11.50	n/a	11.50	n/a	2.70	Plains triangular unnotched
11	20.10	11.40	1.67	16.70	n/a	n/a	n/a	17.00	n/a	17.00	n/a	3.01	Base, mid-section, Plains unnotched
12	17.00	---	---	---	---	---	---	---	---	---	---	2.50	Distal tip
13	23.50	9.30	n/a	15.90	n/a	n/a	n/a	16.50	n/a	16.50	n/a	3.80	Plains triangular unnotched
14	23.20	10.50	n/a	17.90	n/a	n/a	n/a	18.80	n/a	18.80	n/a	3.32	Plains triangular unnotched
15	22.70	---	n/a	---	n/a	---	n/a	---	n/a	---	n/a	3.00	Plains triangular unnotched, incomplete
16	20.00	---	n/a	---	n/a	---	n/a	---	n/a	---	n/a	2.50	Plains triangular unnotched, incomplete
17	30.80	10.50	n/a	18.70	n/a	n/a	n/a	19.20	n/a	19.20	n/a	4.70	Plains triangular unnotched, incomplete
18	15.00	9.80	n/a	18.30	n/a	n/a	n/a	20.90	n/a	20.90	n/a	5.00	Plains triangular unnotched, incomplete

Underlined = Specimen incomplete along this dimension
----- = Measurement unobtainable
n/a = Not applicable

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---- = Measurement unobtainable

n/a = Not applicable

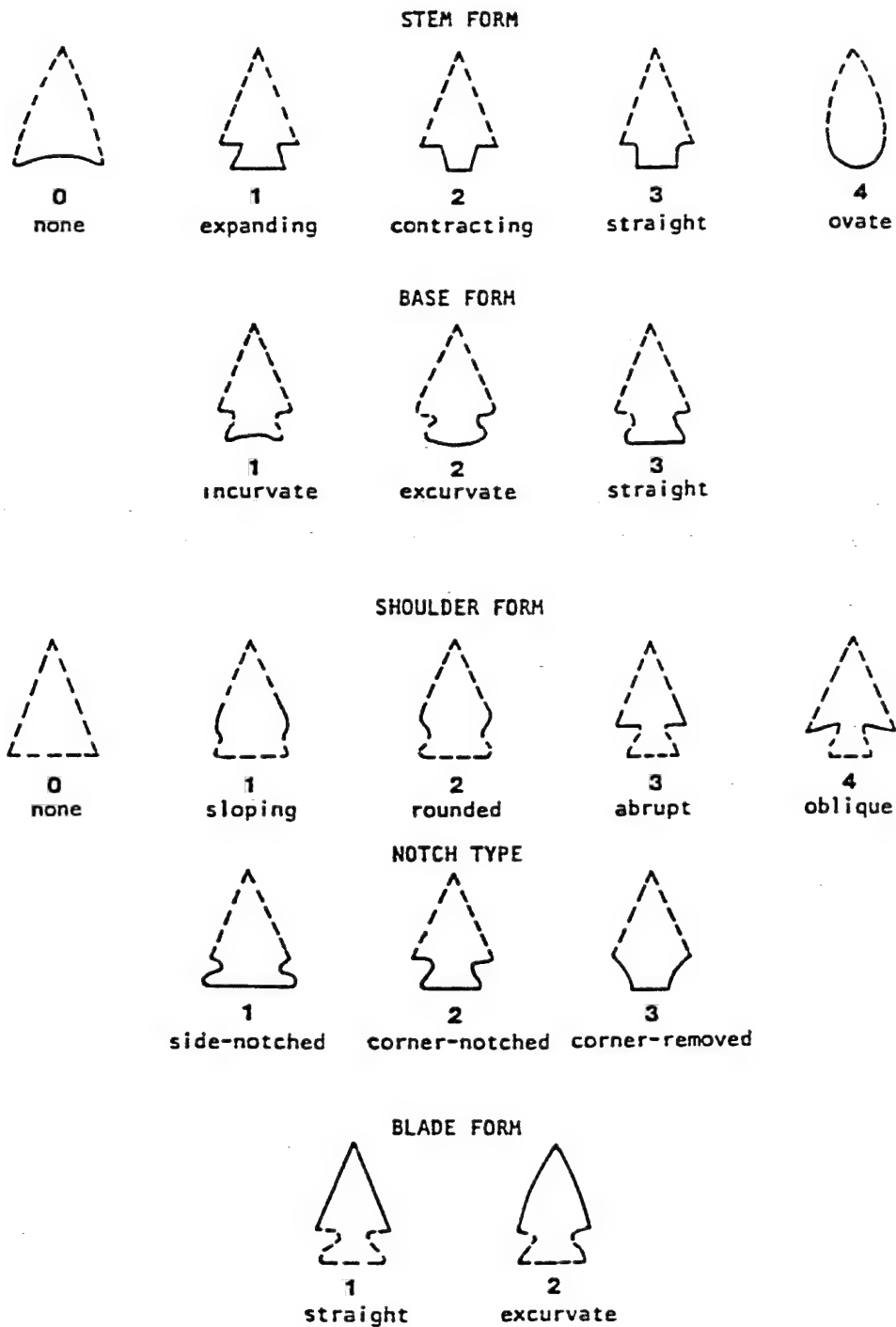
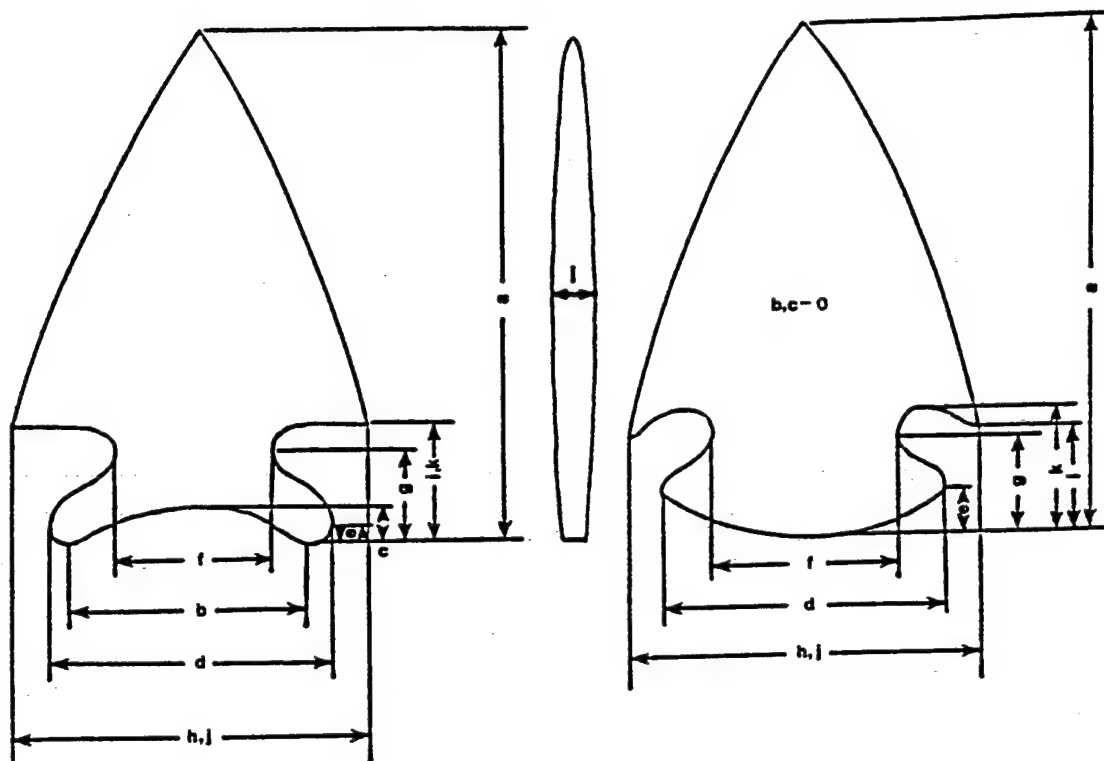


Figure 3. Graphic representation of the five nominal observations utilized in the projectile point analysis.



- | | |
|---------------------------------|-------------------------------|
| a. Total Length | g. Distal Haft Element Length |
| b. Basal Contact Width | h. Blade Base Width |
| c. Basal Center Point Length | i. Shoulder to Base Length |
| d. Proximal Haft Element Width | j. Maximum Width |
| e. Proximal Haft Element Length | k. Total Haft Element Length |
| f. Distal Haft Element Width | l. Maximum Thickness |

Figure 4. Diagram of two generalized projectile point forms indicating the measurements taken in the projectile point analysis (adapted from Ahler 1971:23).

baseline. Proximal haft element length (E) is the average perpendicular distance from the baseline to the two points on the lateral left margins defined above. Distal haft element width (F) is the distance between two points, one on each lateral haft element margin, which are more distally located than the proximal haft element points, and at which the orientation of the lateral haft element margin is most nearly parallel to the centerline, measured parallel to the baseline. Distal haft element length (G) is the average perpendicular distance from the baseline to the two points on the lateral haft element margins defined above. Blade base width (H) is the distance between the two points, one on each lateral blade margin, nearest the baseline, measured parallel to the baseline. Shoulder to base length (I) is the average perpendicular distance from the baseline to the two points defined when measuring blade base width. Maximum width (J) is the greatest distance, measured parallel to the baseline, between any two points on the artifact. Total haft element length (K) is the average perpendicular distance from the blade/haft element division to the baseline. Maximum thickness (L) is the greatest distance, measured perpendicular to the baseline and centerline, between any two points on the artifact. Finally, the cultural/technological complex to which the point has been assigned is again listed.

Scrapers

Eighteen scrapers are present in the assemblage from the 1984 excavations (Plates 6-9). Sixteen of the scrapers are transverse or end scrapers; two lateral or side scrapers were recovered. Transverse scrapers, like projectile points, are consistently patterned and bilaterally symmetrical, and are amenable to more detailed metric analysis and typology. Following a typology similar to that utilized by Lee and Lovick (1979) and Nowak (1981), all of the transverse scrapers recovered from the 1984 excavations at the Lower Grand site were measured and morphologically grouped according to overall shape, dorsal flaking treatment, distal margin shape, and treatment of the lateral margins. The dimensions measured (Table 9) are graphically illustrated in Figure 5. These measurements include total length (A), maximum width (B), maximum thickness (C), transverse chord distance (D), and distal transverse width (E). The context, Munsell color, and raw material type for each specimen are also presented in Table 9.

Type A (Plate 6). These scrapers are generally oval to slightly triangular in shape with a convex distal margin. They are commonly dome-shaped in cross section with numerous dorsal flake scars occurring both perpendicularly and obliquely to the longitudinal axis. They are continuously unifacially retouched on all margins. Four Type A transverse scrapers are present in the assemblage.

Type B (Plate 7). Scrapers in this category are triangular in shape with a straight to slightly convex distal margin. One lateral margin is formed by removing a single long flake from the dorsal surface along the longitudinal axis, leaving a ridge or arris. This technique always produces a triangular cross section. The opposite lateral margin is beveled by removal of numerous dorsal flakes perpendicular to the arris. Secondary retouch occurs only on the lateral and distal margins; the

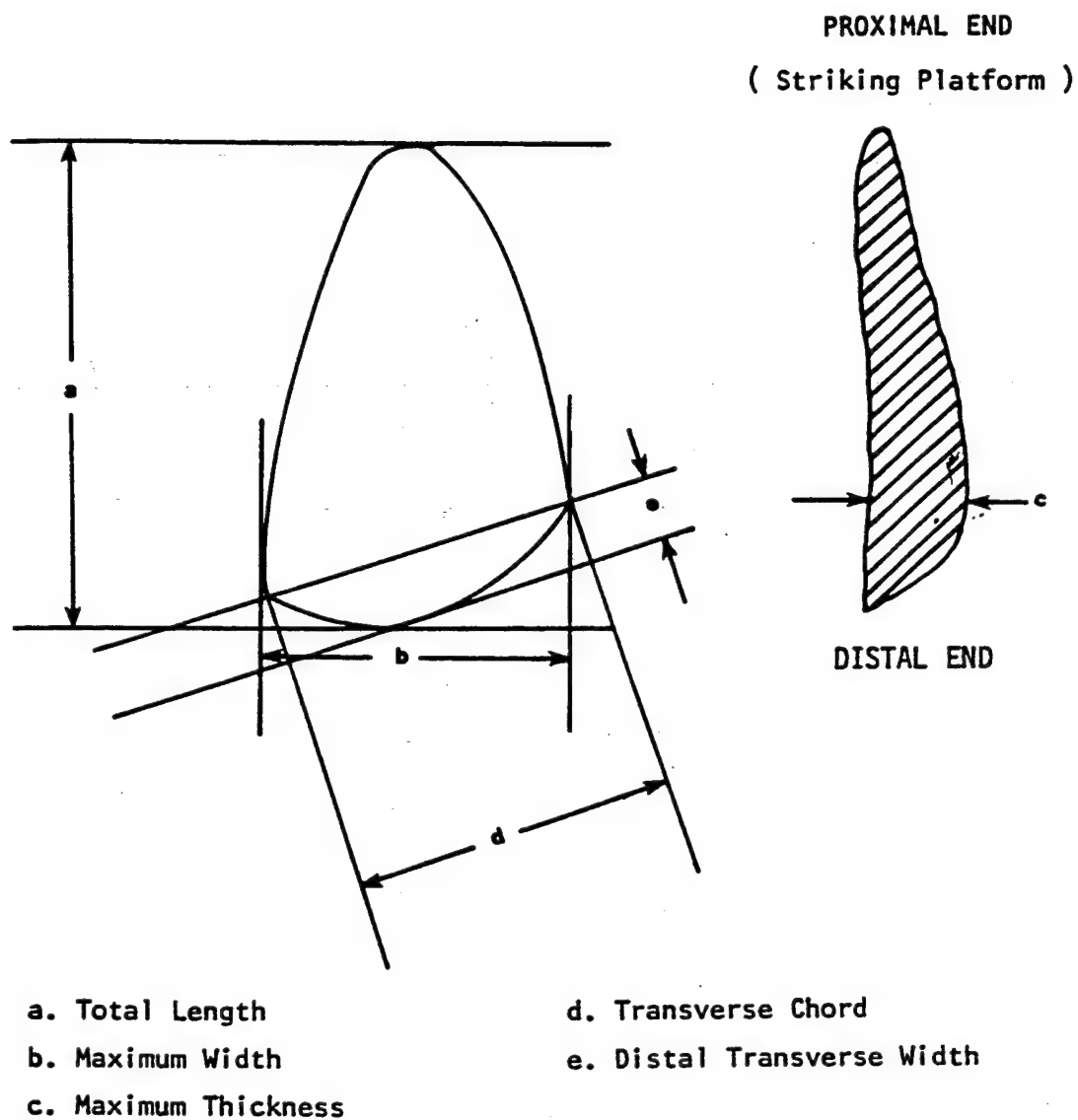


Figure 5. Diagram of a generalized transverse scraper indicating the five measurements taken (adapted from Lee and Lovick 1979).

Table 9. Raw Material and Measurement Summary for Scrapers from the Lower Grand Site.

S-#	CAT #	CONTEXT	MUNSELL COLOR	RAW MATERIAL	SCRAPER TYPE	MEASUREMENT DATA (mm)				
						A	B	C	D	E
1	0	Surface	5YR-3/3 dark red brown	Jasper	Transverse scraper Type B	33.6	24.1	7.5	20.3	4.2
2	0	Surface	10YR-4/1 dark gray	TRSS	Transverse scraper Type C	15.9	21.0	3.7	16.5	7.2
3	0	Surface	2.5YR-5/2 weak red	Agatized chert, heat treated	Transverse scraper Type A	31.6	21.8	8.7	22.2	10.7
4	0	Surface	7.5YR-3/2 dark brown	Brown chalcedony	Transverse scraper Type A	21.1	21.5	4.6	21.2	6.3
5	0	Surface	7.5YR-4/4 brown	Silicified wood	Transverse scraper Type C	20.1	16.5	5.6	---	5.0
6	116	Cache Pit #1?	10R-5/1 reddish gray	Chalcedony	Transverse scraper Type A	34.5	20.9	6.5	20.2	4.8
7	120	Cache Pit #1	10YR-5/2 grayish brown	TRSS	Transverse scraper Type B	28.6	27.2	4.0	26.5	7.2
8	38	Cache Pit #4	10YR-8/2 very pale brown	Silicified wood	Transverse scraper Type B	27.1	16.7	5.8	13.3	5.3
9	102	Cache Pit #4 (South)	10R-3/3 dusky red	Jasper	Transverse scraper Type B	21.6	21.0	5.8	20.9	6.2
10	101	Cache Pit #4 (South)	10YR-3/4 dark yellow brown	Silicified wood	Transverse scraper Type B	28.8	23.8	10.5	23.2	11.1
11	103	Cache Pit #1	2.5Y-7/3 pale yellow	Chert	Transverse scraper Type A	32.5	21.5	7.9	21.0	11.7
12	104	Cache Pit #1	10R-5/1 reddish gray	Chalcedony	Transverse scraper Type B	48.1	20.3	5.0	18.4	4.2
13	31	Cache Pit #4	5YR-5/4 reddish brown	TRSS, heat treated	Transverse scraper Type D	66.1	36.9	10.6	32.0	10.0
14	10	Cache Pit #2	10YR-4/4 dark yellow brown	Brown chalcedony	Transverse scraper Type C	22.3	30.5	7.5	30.1	7.8
15	0	Surface	10YR-6/6 brownish yellow	Silicified wood	Lateral scraper Type E	38.8	15.0	7.5	37.9	5.7
16	36	Cache Pit #4	2.5Y-3/1 very dark gray	Agatized chalcedony	Transverse scraper Type C	18.9	19.0	7.5	21.8	8.8
17	30	Cache Pit #4	7.5YR-8/1 white	Chert	Transverse scraper Type C	22.3	20.9	10.2	16.5	6.0
18	32	Cache Pit #4	10YR-5/2 grayish brown	TRSS, heat treated	Lateral scraper Type E	54.6	24.6	8.8	50.5	8.9

---- = Unobtainable

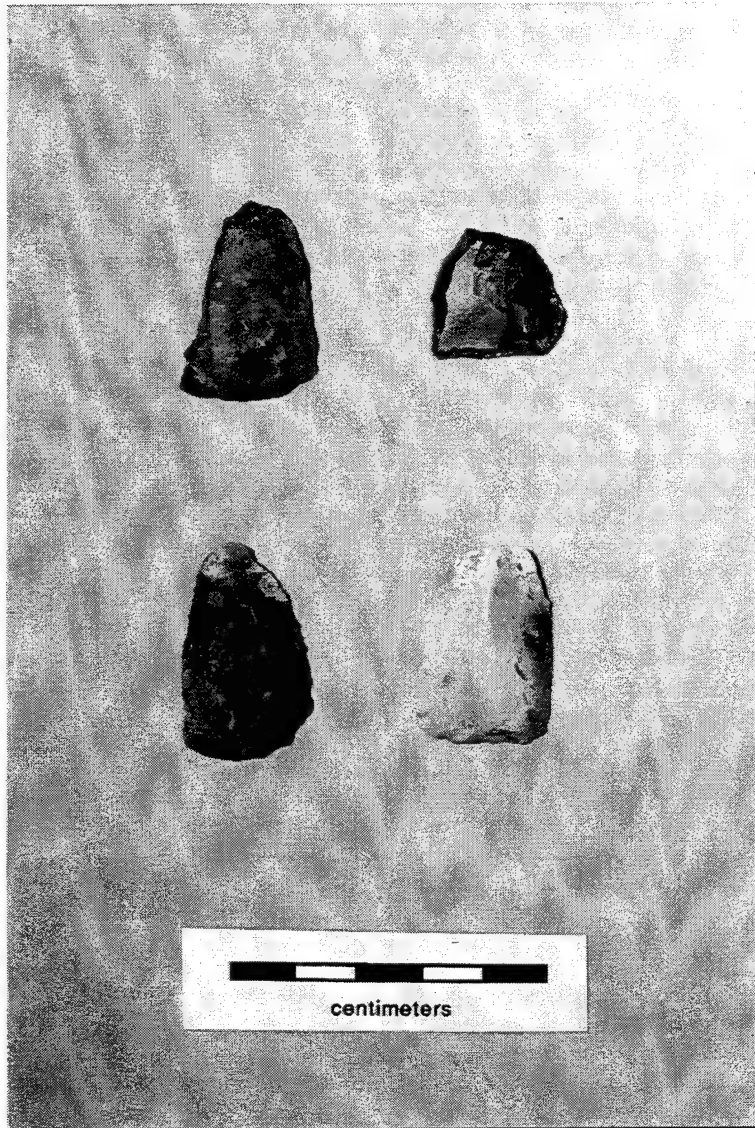


Plate 6. Lower Grand site: scrapers, Type A (l-r: top S3, S4; bottom S6, S11).

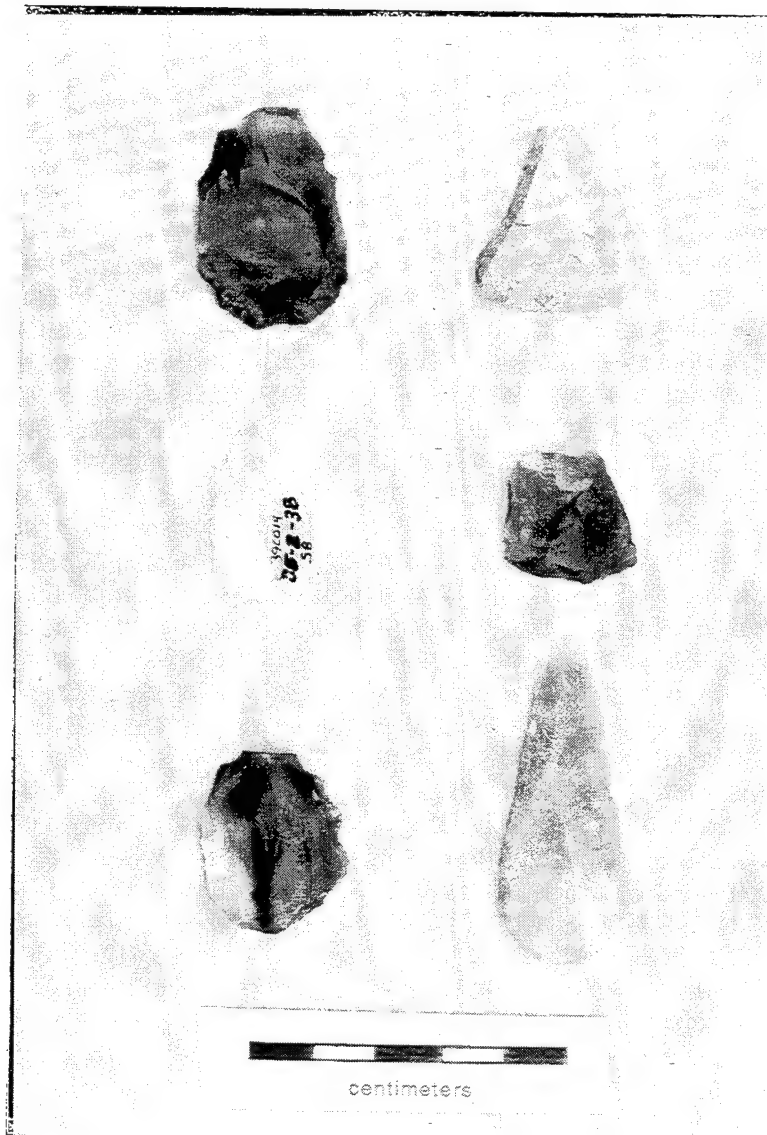


Plate 7. Lower Grand site: scrapers, Type B (l-r: top S1, S7; middle S8, S9; bottom S10, S12).

proximal end normally retains a remnant striking platform. Six Type B transverse scrapers are present in the assemblage.

Type C (Plate 8). Scrapers identified in this category characteristically are oval to slightly rectangular in shape with a wide, slightly convex distal margin. One or two large flakes are removed from the dorsal surface perpendicular to the longitudinal axis, usually leaving a concave depression. The cross section is thin and tabular to slightly concave. Unifacial retouch occurs primarily on the lateral and distal margins with a remnant striking platform retained on the proximal end. These scrapers are frequently broken transversely across the middle, leaving a hinge fracture where the proximal end had been attached. Five Type C transverse scrapers are present in the assemblage.

Type D (Plate 9). This category consists of transverse scrapers made from an expanding decortication flake. Shape is irregularly triangular with both convex and straight distal margins. No flakes are removed from the dorsal side with the exception of the margins, thereby retaining cortex on the entire dorsal surface. Secondary retouch may occur on the lateral margins but often there is no marginal retouch except on the distal edge. One Type D specimen is present in the assemblage.

Type E Lateral Scrapers (Plate 9). This category consists of all lateral scrapers (side-scrapers). As a class these specimens are quite variable and not easily classified. Tools classified here as lateral scrapers include only implements with unifacially developed lateral working edges such that the working edge (lateral chord) is the largest measurement. Lateral scrapers may be unilateral or bilateral; shape may be bilaterally symmetrical but most commonly will be irregular. Two lateral scrapers are present in the assemblage.



Plate 8. Lower Grand site: scrapers, Type C (l-r: top S2, S5; middle S14, S16; bottom S17).

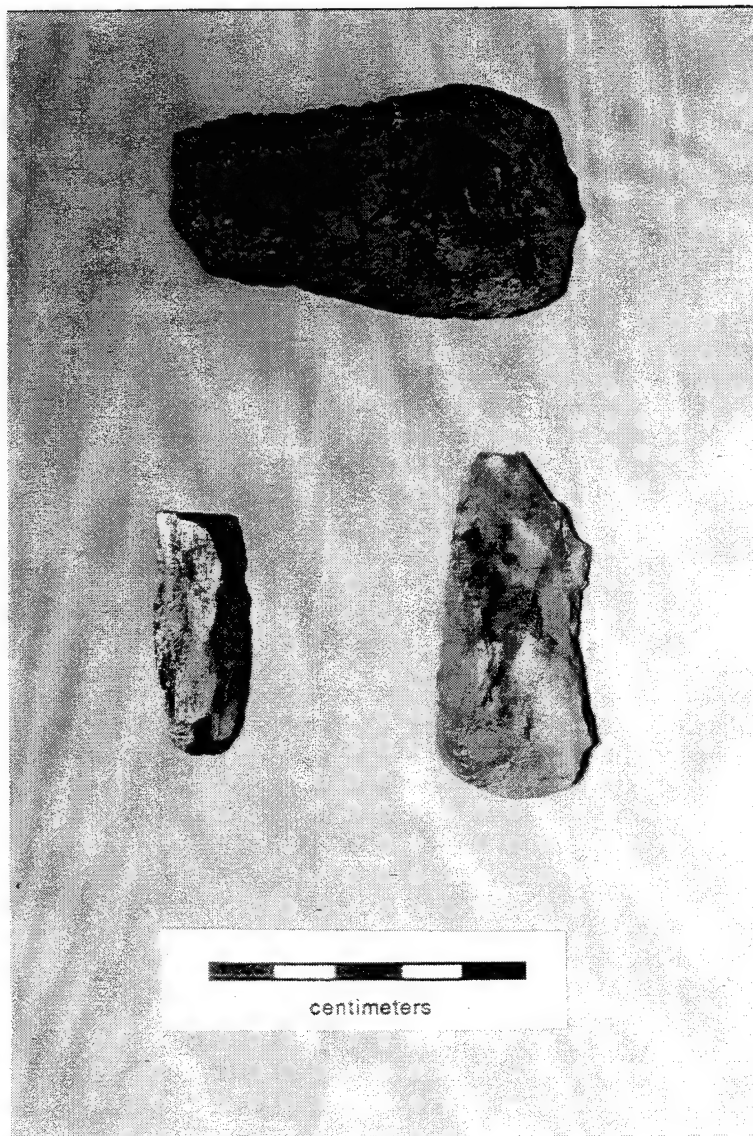


Plate 9. Lower Grand site: scrapers, Type D (top S13) and Type E (l-r: bottom S15, S18).

Bifaces

The term 'biface' is defined here as including lithic pieces which exhibit flake scars on both surfaces. Although suggesting a final manufacturing stage, this category probably also includes blanks and preforms. Specific types of bifaces, such as projectile points, knives, cutting tools, gravers and drills are summarized separately.

A total of eighteen bifaces or biface fragments are described in Table 10, and the specimens are illustrated in Plate 10.

Retouched Flakes

Retouched flakes are defined here as those flakes which exhibit intentional retouch (i.e., thinned for a purpose). Twenty-eight specimens are described in Table 11.

Utilized Flakes

Utilized flakes are defined here as those flakes which exhibit use-wear but no evidence of intentional retouch, i.e., ad hoc tools. Twenty-seven specimens are described in Table 12.

Other Lithic Tools

Fifteen other lithic tool specimens were identified within the 1984 assemblage from the Lower Grand site. These specimens include six bifacial knives or knife fragments (Plate 11:T2-6, 10); three unifacial knives or knife fragments (Plate 12:T7-9); one burinated knife (Plate 12:T11); one Badland's knife (Plate 11:T1); two drill tips (Plate 13:T14-15); one spokeshave (Plate 13:T13); and one burin/graver (Plate 13:T12). These items are described in Table 13.

Table 10. Raw Material and Measurement Summary for Bifaces from the Lower Grand Site.

B-#	CAT #/ CONTEXT	MUNSELL COLOR	RAW MATERIAL	DESCRIPTION/ COMMENTS/USE WEAR	LENGTH (mm)	WIDTH (mm)	THICKNESS (mm)
1	27 Cache Pit #4	2.5Y-2.5/1 black	Gabbro	Bifacial reduction blank/core?	202.50	67.60	28.50
2	93 Cache Pit #5 (North)	10YR-5/2 grayish brown	TRSS	Biface fragment	38.80	23.50	8.40
3	37 Cache Pit #4	2.5Y-5/4 light olive brown	Fine grained quartzite	Ovoid biface	20.05	19.00	3.70
4	124 Cache Pit #1	2.5Y-8/1 white	Chalcedony	Biface fragment	17.50	21.70	7.00
5	126 ?	2.5Y-4/1 dark gray	TRSS	Bifacial reduction blank	34.50	32.70	9.20
6	5 Cache Pit #2	2.5Y-7/1 light gray	Chalcedony	Distal portion of bifacially flaked blade	15.90	18.40	5.90
7	100 Cache Pit #5 (North)	10YR-5/1 gray	Fine grained quartzite	Proximal tip of biface	17.10	22.10	5.30
8	99 Cache Pit #5 (North)	10YR-7/1 light gray	TRSS	Proximal tip of biface	20.03	16.80	3.98
9	108 Cache Pit #1	10YR-6/2 light brown gray	TRSS	Tabular flake with bifacial reduction on lateral margin	30.05	29.50	10.02
10	59 Cache Pit #1	10YR-5/2 grayish brown	TRSS, heat treated	Tabular flake with bifacial reduction on lateral margin	45.70	62.50	17.60
11	0 Surface	10YR-4/1 dark gray	TRSS	Tertiary reduction flake with bifacial flaking	40.02	25.20	10.60
12	0 Surface	10YR-6/1 gray	TRSS	Ovoid biface	42.20	26.90	11.10
13	80 Cache Pit #4 (South)	5YR-5/2 reddish gray	TRSS, heat treated	Fragment of biface	12.10	16.50	3.50
14	30 Cache Pit #4	2.5YR-5/6 red	TRSS, heat treated	Portion of biface	49.50	65.10	12.50

Table 10 (cont.)

B-#	CAT #/ CONTEXT	MUNSELL COLOR	RAW MATERIAL	DESCRIPTION/ COMMENTS/USE WEAR	LENGTH (mm)	WIDTH (mm)	THICKNESS (mm)
15	30 Cache Pit #4	10YR-5/2 grayish brown	TRSS, heat treated	Fragment of biface	39.50	47.50	14.20
16	30 Cache Pit #4	7.5YR-5/1 gray	TRSS, heat treated	Fragment of biface	26.70	45.20	12.90
17	88 Cache Pit #5 (North)	7.5YR-5/3 brown	TRSS, heat treated	Fragment of biface	30.80	44.10	8.00
18	36 Cache Pit #4	10YR-2/2 very dark brown	Brown chalcedony	Fragment of biface	35.60	30.20	13.00

Table 11. Raw Material and Measurement Summary for Retouched Flakes from the Lower Grand Site.

R-#	CAT-# 85-2	CONTEXT	MUNSELL COLOR	RAW MATERIAL	DESCRIPTION/COMMENT/ USE-WEAR	MEASUREMENT DATA (mm)		
						Length	Width	Thick
1	0	Surface	10YR-5/2 grayish brown	TRSS	Tertiary reduction flake with unifacial marginal retouch	91.00	44.30	24.50
2	63	Cache Pit #1	7.5YR-4/1 dark gray	TRSS	Tertiary reduction flake with unifacial retouch	41.50	21.80	4.50
3	30	Cache Pit #4	10YR-5/2 grayish brown	TRSS	Tertiary reduction flake with unifacial retouch	37.60	20.90	7.90
4	91	Cache Pit #5 (North)	10YR-5/1 gray	TRSS	Tertiary reduction flake with unifacial retouch	24.40	23.40	2.80
5	80	Cache Pit #4 (South)	10YR-5/1 gray	TRSS	Tertiary reduction flake with unifacial retouch	27.00	18.30	2.90
6	115	Cache Pit #1?	10YR-7/2 light gray	TRSS	Tertiary reduction flake with unifacial retouch	27.50	18.50	3.20
7	121	Cache Pit #1	10YR-5/2 grayish brown	TRSS	Tertiary reduction flake with unifacial retouch	22.10	18.30	6.20
8	91	Cache Pit #5 (North)	7.5YR-4/1 dark gray	TRSS	Tertiary reduction flake with unifacial retouch	24.00	16.60	2.70
9	81	Cache Pit #4 (South)	2.5YR-N3/ dark red gray	Quartzite	Tertiary reduction flake with unifacial retouch	33.50	22.70	2.90
10	91	Cache Pit #5 (North)	10YR-7/2 light gray	Quartzite	Tertiary reduction flake with unifacial retouch	28.60	25.60	4.30
11	59	Cache Pit #1	2.5YR-4/6 red	TRSS, heat treated	Tertiary reduction flake with unifacial retouch	40.50	24.70	15.20
12	0	Surface	10YR-6/2 light brown gray	TRSS	Tertiary reduction flake with bifacial retouch	35.90	29.60	9.20
13	30	Cache Pit #4	10YR-3/2 very dark grayish brown	Quartzite	Tertiary reduction flake with bifacial retouch	32.00	30.70	5.40
14	80	Cache Pit #4 (South)	2.5YR-4/2 weak red	Quartzite	Tabular flake with bifacial retouch	16.20	37.20	9.70

Table 11 (cont.)

R-#	CAT-# 85-2	CONTEXT	MUNSELL COLOR	RAW MATERIAL	DESCRIPTION/COMMENT/ USE-WEAR	MEASUREMENT DATA (mm)		
						Length	Width	Thick
15	0	Surface	2.5Y-5/3 light yellow brown	TRSS, heat treated	Secondary reduction flake with unifacial marginal retouch	123.50	49.70	18.10
16	81	Cache Pit #4 (South)	10YR-6/2 light brown gray	TRSS	Secondary reduction flake with unifacial marginal retouch	21.50	12.50	3.40
17	36	Cache Pit #4	2.5Y-5/3 light olive brown	TRSS, heat treated	Secondary reduction flake with unifacial marginal retouch	33.20	19.30	4.20
18	36	Cache Pit #4	10YR-4/3 brown	Brown chalcedony	Secondary reduction flake with unifacial marginal retouch	43.40	20.60	5.00
19	0	Surface	10YR-4/2 dark gray brown	TRSS	Secondary reduction flake with unifacial marginal retouch	33.30	24.70	7.30
20	91	Cache Pit #5 (North)	10YR-3/2 very dark gray brown	Brown chalcedony	Secondary reduction flake with unifacial marginal retouch	22.60	11.90	3.55
21	118	Cache Pit #4	10YR-5/1 gray	TRSS	Secondary reduction flake with unifacial marginal retouch	34.20	23.80	5.90
22	88	Cache Pit #5 (North)	10YR-6/2 light brown gray	TRSS	Secondary reduction flake with unifacial marginal retouch	46.00	37.30	7.50
23	30	Cache Pit #4	5YR-5/2 red gray	TRSS, heat treated	Secondary reduction flake with bifacial marginal retouch	31.90	22.20	5.10
24	80	Cache Pit #4 (South)	7.5YR-5/1 gray	TRSS	Secondary reduction flake with bifacial marginal retouch	18.30	23.80	4.60
25	95	Cache Pit #5 (North)	10YR-5/2 gray brown	TRSS	Tertiary reduction blade with unifacial marginal retouch	62.30	26.60	10.50
26	59	Cache Pit #1	10YR-5/2 gray brown	TRSS	Tertiary reduction blade with unifacial marginal retouch	31.20	19.30	5.10
27	11	Cache Pit #4	2.5Y-7/2 light gray	Chalcedony	Secondary reduction flake with unifacial marginal retouch	15.60	20.80	3.70
28	80	Cache Pit #4 (South)	10YR-3/4 dark yellow brown	Brown chalcedony	Tertiary reduction flake with bifacial marginal retouch	18.70	14.90	3.10

Table 12. Raw Material and Measurement Summary for Utilized Flakes from the Lower Grand Site.

U-#	CAT #	CONTEXT	MUNSELL COLOR	RAW MATERIAL	DESCRIPTION/COMMENT /USE-WEAR	MEASUREMENT DATA (mm)		
						Length	Width	Thick
1	63	Cache Pit #1	5YR-5/2 red gray	Quartzite	Tertiary reduction flake with edge wear	30.50	37.80	4.80
2	30	Cache Pit #4	5YR-4/2 dark red gray	Quartzite	Tertiary reduction flake with edge wear	41.20	29.60	5.60
3	0	Surface	10YR-6/2 light brown gray	Chalcedony	Tertiary reduction flake with edge wear	41.50	22.50	21.75
4	30	Cache Pit #4	7.5YR-6/1 gray	TRSS, heat treated	Tertiary reduction flake with edge wear	35.30	22.80	7.30
5	30	Cache Pit #4	7.5YR-5/2 brown	TRSS, heat treated	Tertiary reduction flake with edge wear	40.00	29.80	6.70
6	30	Cache Pit #4	5YR-5/3 red brown	TRSS, heat treated	Tertiary reduction flake with edge wear	37.10	29.30	5.20
7	0	Surface	GLEYN4/ dark gray	Quartzite	Tertiary reduction flake with edge wear	33.50	31.20	6.40
8	0	Surface	10YR-5/6 yellow brown	Brown chalcedony	Tertiary reduction flake with edge wear	35.50	14.20	3.20
9	30	Cache Pit #4	10YR-5/2 gray brown	TRSS	Tertiary reduction flake with edge wear	47.30	51.60	9.60
10	59	Cache Pit #1	7.5YR-5/2 brown	TRSS, heat treated	Tertiary reduction flake with edge wear	55.40	30.00	6.60
11	59	Cache Pit #1	10YR-6/1 gray	TRSS	Tertiary reduction flake with edge wear	27.40	19.40	3.00
12	59	Cache Pit #1	10YR-5/1 gray	TRSS	Tertiary reduction flake with edge wear	35.60	25.10	5.40
13	80	Cache Pit #4 (South)	2.5YR-5/2 weak red	TRSS, heat treated	Tertiary reduction flake with edge wear	43.40	27.20	3.90
14	30	Cache Pit #4	7.5YR-5/2 brown	TRSS	Tertiary reduction flake with edge wear	40.10	15.30	5.30
15	30	Cache Pit #4	7.5YR-5/3 brown	TRSS, heat treated	Tertiary reduction flake with edge wear	35.50	20.20	7.10

Table 12 (cont.)

U-#	CAT #	CONTEXT	MUNSELL COLOR	RAW MATERIAL	DESCRIPTION/COMMENT /USE-WEAR	MEASUREMENT DATA (mm)		
						Length	Width	Thick
16	63	Cache Pit #1	10YR-8/2 very pale brown	Chalcedony	Tertiary reduction flake with edge wear	30.60	19.30	3.60
17	59	Cache Pit #1	7.5YR-5/2 brown	TRSS, heat treated	Tertiary reduction flake with edge wear	40.10	38.80	7.40
18	30	Cache Pit #4	10YR-6/1 gray	Quartzite	Tertiary reduction flake with edge wear	33.50	23.30	4.80
19	88	Cache Pit #5 (North)	7.5YR-5/2 brown	TRSS, heat treated	Tertiary reduction flake with edge wear	34.30	19.90	3.60
20	0	Surface	5YR-3/1 very dark gray	Quartzite	Tertiary reduction flake with edge wear	24.90	27.10	5.60
21	80	Cache Pit #4 (South)	7.5YR-5/1 gray	TRSS	Secondary reduction flake with edge wear	33.60	17.90	7.00
22	0	Surface	10YR-7/2 light gray	TRSS	Secondary reduction flake with edge wear	40.90	34.20	7.60
23	30	Cache Pit #4	10YR-7/2 light gray	Chert	Secondary reduction flake with edge wear	20.60	23.60	8.40
24	30	Cache Pit #4	10YR-5/2 gray brown	TRSS	Secondary reduction flake with edge wear	30.50	26.90	6.20
25	30	Cache Pit #4	2.5Y-5/3 light olive brown	TRSS, heat treated	Secondary reduction flake with edge wear	23.50	39.40	11.20
26	59	Cache Pit #1	10YR-6/2 light brown gray	TRSS	Primary reduction flake with edge wear	32.80	25.40	5.70
27	125	Cache Pit #1	10YR-3/2 very dark gray brown	Brown chalcedony	Secondary blade flake with edge wear	27.80	24.80	5.50

Table 12. Raw Material and Measurement Summary for Utilized Flakes from the Lower Grand Site.

U-#	CAT #	CONTEXT	MUNSELL COLOR	RAW MATERIAL	DESCRIPTION/COMMENT /USE-WEAR	MEASUREMENT DATA (mm)		
						Length	Width	Thick
1	63	Cache Pit #1	5YR-5/2 red gray	Quartzite	Tertiary reduction flake with edge wear	30.50	37.80	4.80
2	30	Cache Pit #4	5YR-4/2 dark red gray	Quartzite	Tertiary reduction flake with edge wear	41.20	29.60	5.60
3	0	Surface	10YR-6/2 light brown gray	Chalcedony	Tertiary reduction flake with edge wear	41.50	22.50	21.75
4	30	Cache Pit #4	7.5YR-6/1 gray	TRSS, heat treated	Tertiary reduction flake with edge wear	35.30	22.80	7.30
5	30	Cache Pit #4	7.5YR-5/2 brown	TRSS, heat treated	Tertiary reduction flake with edge wear	40.00	29.80	6.70
6	30	Cache Pit #4	5YR-5/3 red brown	TRSS, heat treated	Tertiary reduction flake with edge wear	37.10	29.30	5.20
7	0	Surface	GLY-N4/ dark gray	Quartzite	Tertiary reduction flake with edge wear	33.50	31.20	6.40
8	0	Surface	10YR-5/6 yellow brown	Brown chalcedony	Tertiary reduction flake with edge wear	35.50	14.20	3.20
9	30	Cache Pit #4	10YR-5/2 gray brown	TRSS	Tertiary reduction flake with edge wear	47.30	51.60	9.60
10	59	Cache Pit #1	7.5YR-5/2 brown	TRSS, heat treated	Tertiary reduction flake with edge wear	55.40	30.00	6.60
11	59	Cache Pit #1	10YR-6/1 gray	TRSS	Tertiary reduction flake with edge wear	27.40	19.40	3.00
12	59	Cache Pit #1	10YR-5/1 gray	TRSS	Tertiary reduction flake with edge wear	35.60	25.10	5.40
13	80	Cache Pit #4 (South)	2.5YR-5/2 weak red	TRSS, heat treated	Tertiary reduction flake with edge wear	43.40	27.20	3.90
14	30	Cache Pit #4	7.5YR-5/2 brown	TRSS	Tertiary reduction flake with edge wear	40.10	15.30	5.30
15	30	Cache Pit #4	7.5YR-5/3 brown	TRSS, heat treated	Tertiary reduction flake with edge wear	35.50	20.20	7.10

Table 12 (cont.)

U-#	CAT #	CONTEXT	MUNSELL COLOR	RAW MATERIAL	DESCRIPTION/COMMENT /USE-WEAR	MEASUREMENT DATA (mm)		
						Length	Width	Thick
16	63	Cache Pit #1	10YR-8/2 very pale brown	Chalcedony	Tertiary reduction flake with edge wear	30.60	19.30	3.60
17	59	Cache Pit #1	7.5YR-5/2 brown	TRSS, heat treated	Tertiary reduction flake with edge wear	40.10	38.80	7.40
18	30	Cache Pit #4	10YR-6/1 gray	Quartzite	Tertiary reduction flake with edge wear	33.50	23.30	4.80
19	88	Cache Pit #5 (North)	7.5YR-5/2 brown	TRSS, heat treated	Tertiary reduction flake with edge wear	34.30	19.90	3.60
20	0	Surface	5YR-3/1 very dark gray	Quartzite	Tertiary reduction flake with edge wear	24.90	27.10	5.60
21	80	Cache Pit #4 (South)	7.5YR-5/1 gray	TRSS	Secondary reduction flake with edge wear	33.60	17.90	7.00
22	0	Surface	10YR-7/2 light gray	TRSS	Secondary reduction flake with edge wear	40.90	34.20	7.60
23	30	Cache Pit #4	10YR-7/2 light gray	Chert	Secondary reduction flake with edge wear	20.60	23.60	8.40
24	30	Cache Pit #4	10YR-5/2 gray brown	TRSS	Secondary reduction flake with edge wear	30.50	26.90	6.20
25	30	Cache Pit #4	2.5Y-5/3 light olive brown	TRSS, heat treated	Secondary reduction flake with edge wear	23.50	39.40	11.20
26	59	Cache Pit #1	10YR-6/2 light brown gray	TRSS	Primary reduction flake with edge wear	32.80	25.40	5.70
27	125	Cache Pit #1	10YR-3/2 very dark gray brown	Brown chalcedony	Secondary blade flake with edge wear	27.80	24.80	5.50

Table 13. Raw Material and Measurement Summary for Other Lithic Tools from the Lower Grand Site.

T-#	CAT. #/ CONTEXT	MUNSELL COLOR	RAW MATERIAL	DESCRIPTION/ COMMENT/USE-WEAR	MEASUREMENT DATA (mm)		
					Length	Width	Thick
1	33 Cache Pit #4	7.5YR-7/1 light gray	Plate chalcedony	Badlands knife-bifacial	116.20	44.90	12.00
2	80 Cache Pit #4 (South)	7.5YR-5/2 brown	Fine grained quartzite	Fragment of bifacial knife	35.30	25.20	7.20
3	0 Surface	10YR-6/1 gray	TRSS	Fragment of bifacial knife	88.60	30.90	5.20
4	36 Cache Pit #4	2.5Y-6/3 light yellow brown	TRSS	Bifacial knife	48.10	66.50	19.80
5	92 Cache Pit #5 (North)	2.5Y-7/2 light gray	TRSS	Fragment of bifacial knife	53.10	59.00	9.20
6	123 Cache Pit #1	7.5YR-7/1 light gray	TRSS	Fragment of bifacial knife?	16.90	22.20	3.90
7	109 Cache Pit #1	10YR-5/1 gray	TRSS	Fragment of unifacial knife	33.40	53.00	7.00
8	122 Cache Pit #1	10YR-4/1 dark gray	TRSS	Unifacial knife on tertiary flake	33.70	24.02	5.30
9	127 ?	10YR-6/1 gray	TRSS	Fragment of unifacial knife	45.70	40.98	10.03
10	9 Cache Pit #2	5YR-4/6 yellowish red	TRSS, heat treated	Ovoid bifacial knife	37.60	25.50	5.30
11	96 Cache Pit #5 (North)	7.5YR-3/3 dark brown	Brown chalcedony	Burinated knife on tertiary flake	38.70	18.20	4.40
12	8 Cache Pit #2	2.5Y-3/3 dark red brown	Jasper	Burin/graver on blade with unifacial flaking on lateral margins	62.60	16.00	5.40
13	97 Cache Pit #5 (North)	10YR-2/2 very dark brown	Brown chalcedony	Spokeshave on primary reduction flake	34.00	21.30	9.10
14	4 Cache Pit #2	5YR-4/2 dark red gray	TRSS, heat treated	Drill tip	42.50	17.50	7.60
15	114 Cache Pit #1?	5YR-7/3 pink	TRSS	Drill tip	28.90	17.50	5.00

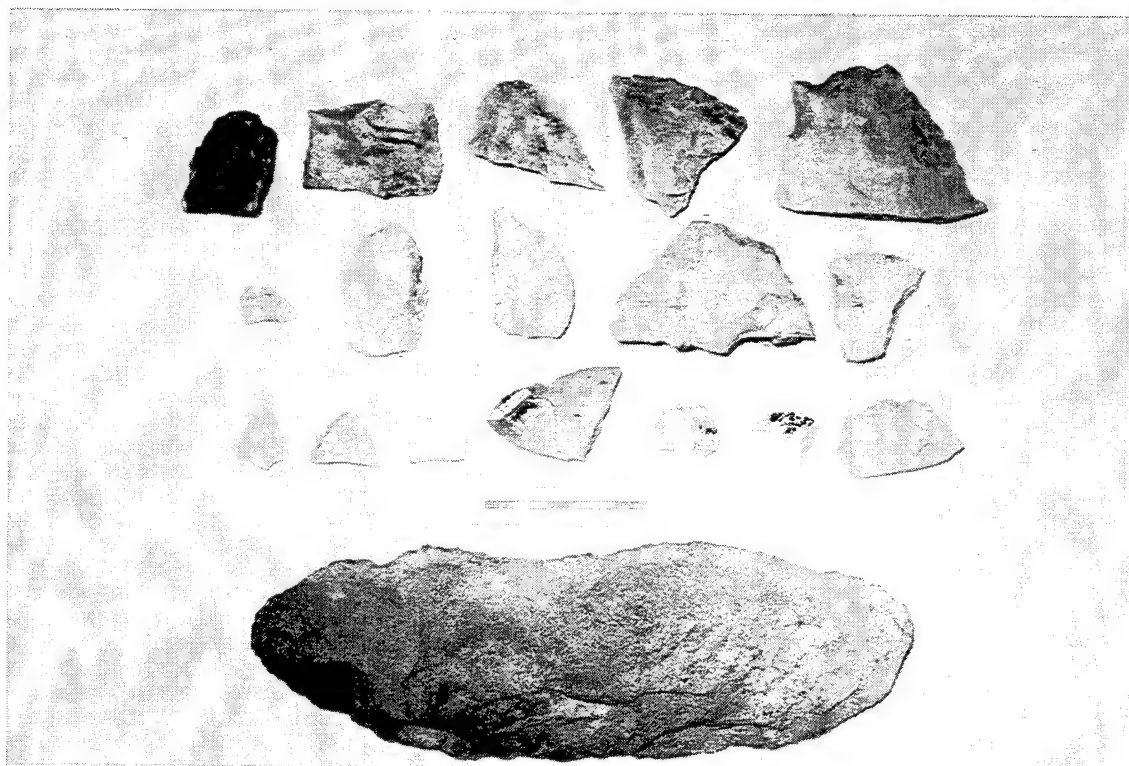


Plate 10. Lower Grand site: bifaces (l-r: top B1-5; upper middle B6-10; lower middle B11-17; bottom B18).

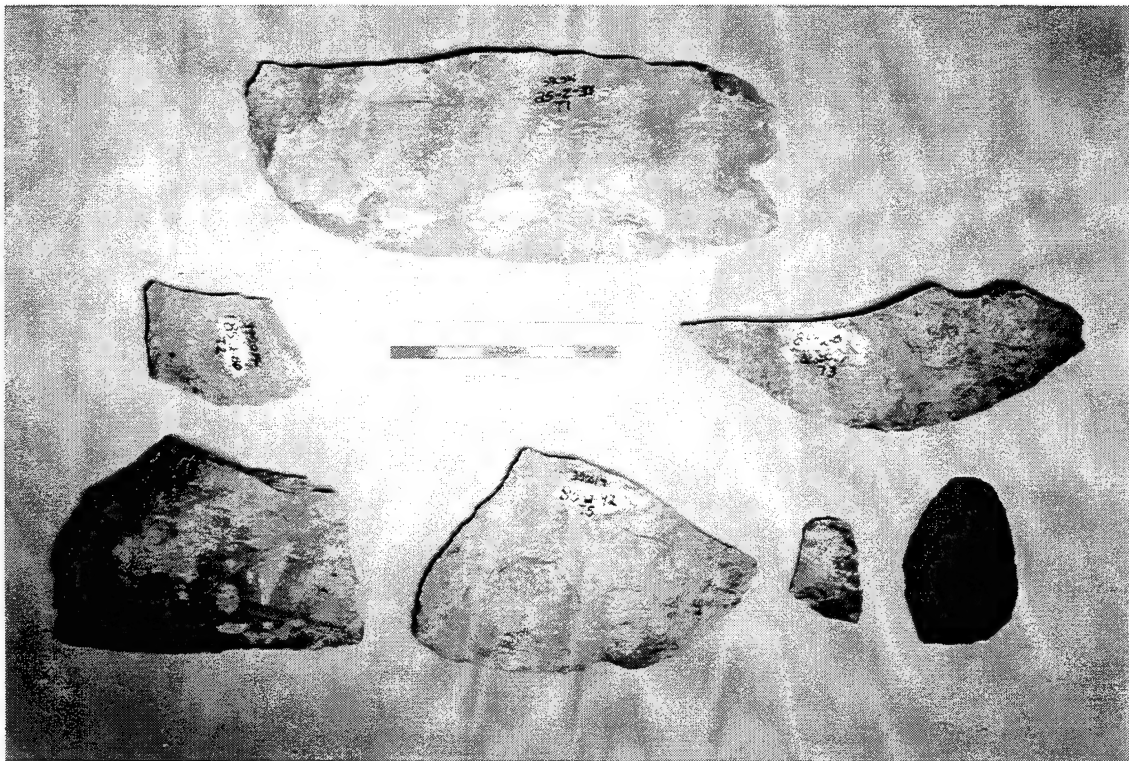


Plate 11. Lower Grand site: bifacial knife fragments (top T1-Badlands knife; l-r: middle T2, T3; bottom T4, T5, T6, T10).

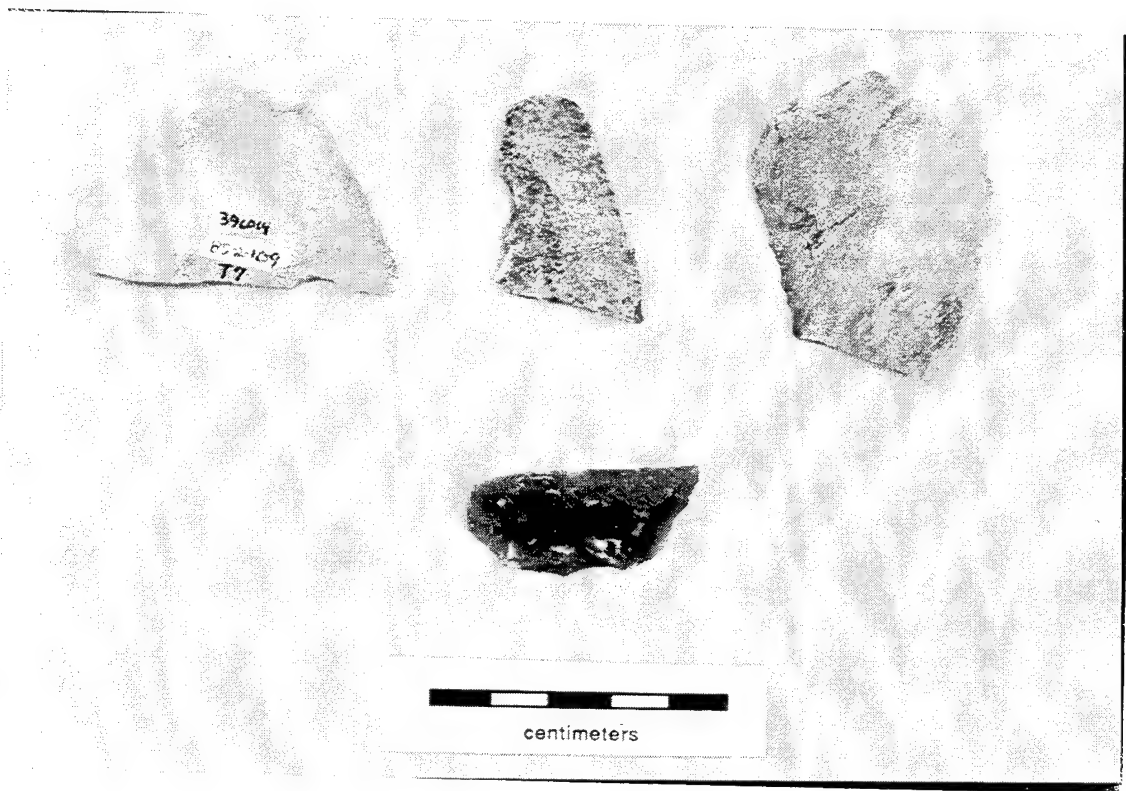


Plate 12. Lower Grand site: unifacial knife fragments (l-r: top T7, T8, T9; bottom T11-burinated knife).



Plate 13. Lower Grand site: graver, spokeshave and drills (l-r: top T12 graver, T13 spokeshave; bottom T14, T15 [drills]).

GROUND STONE TOOLS

by L. Adrien Hannus

Five items classified as ground stone tools were present in the 1984 assemblage. These items include hammerstones (Plate 14) and abraders (Plate 15). They are described in Table 14.

Table 14. Ground Stone Tools from the Lower Grand Site.

G-#	CAT #/ CONTEXT	MUNSELL COLOR	RAW MATERIAL	DESCRIPTION/ COMMENT/ USE-WEAR	MEASUREMENT DATA (mm)		
					LENGTH	WIDTH	THICK
1	28 Cache Pit #4	Gley-5B4/1 dark blue gray	Gabbro	Ovoid cobble exhibits edge pecking/ grinding. Hammerstone?	62.70	54.40	37.40
2	35 Cache Pit #4	2.5Y-4/3 olive brown	Quartzite	Ovoid cobble with pecking/crushing on distal-proximal ends. Hammerstone.	70.70	50.00	28.20
3	29 Cache Pit #4	10YR-2/1 black	Pumice-tuff	Shaft abrader. Exhibits multiple grooves.	62.20	53.00	35.70
4	40(A) Cache Pit #4	10YR-4/4 dark yellow brown	Sandstone	Fragment of shaft abrader. Single groove.	25.70	21.80	10.80
5	60 Cache Pit #1	2.5YR-3/4 dark red brown	Pumice-tuff	Abrader. Exhibits multiple grinding surfaces.	35.20	34.50	20.50



Plate 14. Lower Grand site: hammerstones (l-r: G1, G2).

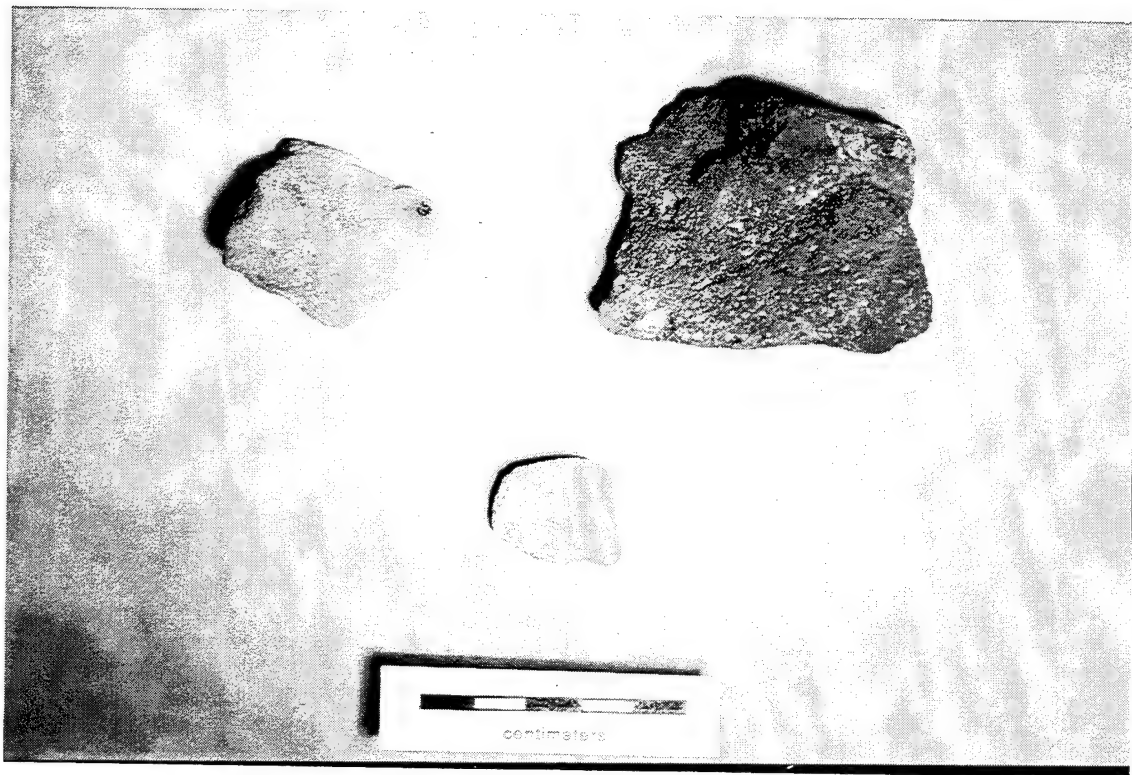


Plate 15. Lower Grand site: abrasers (l-r: top G5, G3; bottom G4).

UNMODIFIED STONE FRAGMENTS

by L. Adrien Hannus

Eight items of unmodified stone and one fragment of yellow ochre were present in the assemblage. It is likely that these pieces all occur 'naturally,' but they were present within cultural features. They are described in Table 15.

Table 15. Unmodified Stone and Concretions Observed in the 1984 Assemblage from the Lower Grand Site.

CONTEXT	CAT. #	MUNSELL COLOR	RAW MATERIAL	DESCRIPTION/ COMMENT	MEASUREMENT DATA (MM)		
					LENGTH	WIDTH	THICK
Cache Pit #2	48		Yellow ochre fragment	Unmodified	22.00	14.00	14.50
Cache Pit #4	19	10YR-5/8 yellow brown	Iron concretion	Unmodified ovoid concretion	178.10	89.00	25.90
Cache Pit #4	29	2.5YR-4/6 red	Pumice-tuff	Unmodified fragment	40.70	41.00	34.10
Cache Pit #4	30-1	5YR-4/4 reddish brown	Calcite	Unmodified fragment	18.40	18.10	6.50
Cache Pit #4	30-2	10YR-8/1 white	Calcite crystal	Unmodified fragments	30.50	4.70	5.70
Cache Pit #4	30-3	10YR-5/2 gray brown	Sandstone	Unmodified fragment	25.10	17.50	6.10
Cache Pit #4	34	2.5Y-7/2 light gray	Sandstone	Unmodified fragment	54.60	54.40	16.00
Cache Pit #4	40B	2.5Y-6/2 light brown gray	Sandstone	Unmodified fragment	35.90	26.90	10.50
Cache Pit #5 (North - Profile 6)	89	2.5Y-2.5/1 black	Pumice-tuff	Unmodified fragments	34.50	26.70	19.90

FIRE-CRACKED ROCK by L. Adrien Hannus

In addition to the lithics which have been heat-treated to improve workability (summarized in the section above), 15 fragments of fire-cracked rock were present in the collections. Fire-cracked rock is defined here as rock which appears to display fragmentation due to heat-induced oxidation. These items are summarized in Table 16.

Table 16. Fire-cracked Rock from the Lower Grand Site.

LOCATION	CAT. #	RAW MATERIAL	# PIECES	WEIGHT (g)
Cache Pit #1	119	Granite	2	78
Cache Pit #4	39	Granite	5	169
Cache Pit #4	30	Gneiss	1	55
South Cache Pit	74	Granite	1	15.5
North Cache Pit	90	Granite	5	174
North Cache Pit	90	Limestone-chert	1	11

PREVIOUS WORK ON LITHIC MATERIALS FROM THE LOWER GRAND SITE (summarized from Falk and Ahler 1988:64-66)

An examination of chipped stone tools recovered during the 1962-1964 and 1969 excavations was completed by Ahler (1975a, 1975b). In conjunction with these studies, Ahler also initiated a survey of lithic resources available to village groups in the Middle Missouri subarea (Ahler 1975c). Using data from the Lower Grand, Walth Bay, Helb and Jake White Bull sites, Ahler (1977) examined lithic resource utilization, comparing and contrasting patterns evidenced by Coalescent and Middle Missouri tradition populations. A sample of end scrapers from the Lower Grand site was also employed in a discussion of the functional analysis of non-obsidian chipped stone tools (Ahler 1979). In addition, aspects of use-phase classification and manufacturing technology were examined utilizing a sample of arrowpoints from the site (Ahler 1983). Under Ahler's direction, data on chipped stone flaking debris, fire-cracked rock and natural rock debris have been recorded and entered on computer cards for future distributional analysis (Ahler 1976a).

FAUNAL REMAINS

by Kerry Lippincott and Timothy V. Gillen

All faunal material from the 1984 excavations was initially sorted into two groups, those fragments which were possibly identifiable and those which were unidentifiable. This division was based on the presence or absence of articular surfaces and diagnostic landmarks which would allow identification of the specimens by element and by side, and to a useful taxonomic level. The possibly identifiable bones were sequentially numbered by context and subdivided into one of five broad categories: 1) large mammal, 2) medium mammal, 3) small mammal/rodent, 4) avian, 5) fish/reptile/amphibian. Reference texts used in this preliminary sorting included Evans and de Lahunta (1980), Gilbert, Martin and Savage (1985), Gilbert (1990), Olsen (1960, 1964, 1968) and Torres, Enciso and Porras (1986).

Large mammal remains were examined by ALAC personnel and by consultant Kerry Lippincott. The medium mammal, small mammal/rodent, avian and fish/reptile/amphibian remains were examined by outside consultants and are discussed separately. Unidentifiable fragments are also discussed below.

Appendix I summarizes the results of the analysis for all possibly identifiable large mammal bone. Identified elements were also macroscopically examined for evidence of butchering marks and burning. These data are also included in Appendix I. Gaps in the catalog sequence indicate that a particular specimen was not satisfactorily identified. The latter specimens have been included with the unidentifiable fragments.

Unmodified Large Mammal Bone

For purposes of this discussion, large mammal bone consists of four genera: *Bison*, *Bos*, *Odocoileus* and *Antilocapra*. Comparative specimens of *Bison bison*, *Bos taurus*, *Odocoileus virginianus*, *Odocoileus hemionus*, *Antilocapra americana* and reference texts (Gilbert 1990; Olsen 1960, 1964; Torres, Enciso and Porras 1986) were utilized in the identifications.

A total of 184 large mammal bones were identified to the level of genera. *Bison bison* comprised 92.4 percent of the total identified bone (170 specimens); *Odocoileus* sp. remains comprised 2.7 percent (5 specimens) of the total; the single *Antilocapra* specimen accounts for 0.5 percent of the total; and the 8 specimens identified to the level of *Odocoileus/Antilocapra* comprise 4.4 percent of the total identified bone. Identifiable *Bos taurus* remains were not recovered from this site.

Bison bison

Nearly all elements of *Bison bison* are present at the site. Skulls, mandibles, cervical, thoracic, lumbar and caudal vertebrae, scapulae, proximal and distal fore limbs, distal hind limbs, carpals, tarsals and phalanges were identified. Notably absent are identifiable elements of the femur, pelvis and sacrum. Table 17, below, summarizes the identified *Bison bison* elements.

Table 17. Identified *Bison bison* Elements from the Lower Grand Site.

<i>Bison bison</i>				
ELEMENT	Left	Right	Indeterminate Side or Axial	Minimum Number of Individuals
Petrous portion of temporal	1		1	1
Zygomatic		1		1
Horn core + sheath		1		1
Mandible	2	3		2
Atlas			1	1
Cervical Vertebra			2	2
Thoracic Vertebra			Fragments	
Lumbar Vertebra			2	
Caudal Vertebra			4	
Rib			Fragments	
Scapula	2	9	6	9 (4)
Humerus	2	2		2
Radius	2	3		3
Ulna	4	1		4
Pisiform			2	1
Scaphoid			1	1
Lunar	1	1		1
Carpal cuneiform	1	4		4
Trapezoid-magnum	2	1		2
Unciform	1			1
Metacarpal	2			2
Patella	4	2		4
Tibia	2	1		2
Calcaneus	3			3
Astragalus	4			4
Navicular-cuboid	1	1		1
Entocuneiform	3	2	1	3
Fibulare	1			1
Metatarsal	6	2		4
Phalange 1			2 1	
Phalange 2			2 0	
Phalange 3			1 6	
Proximal sesamoid			3	
Distal sesamoid			2	

The minimum number of individuals (MNI) represented from the excavations is nine, based on the presence of scapulae and scapula hoe fragments. However, the tools may have been curated for some time, and are not necessarily indicative of individuals actually processed at the site. When scapula tools are excluded from the calculations, a MNI of four is suggested from the scapulae, and confirmed by five additional elements (left ulnae, right carpal cuneiforms, left patellae, left metatarsals and left astragali). Due to the small area of the site represented by the 1984 excavations and the lack of specific data from previous investigations, no estimates of available meat or kilocalories were attempted.

Twenty-one identified bones exhibited evidence of burning, as represented by discoloration, vitrification and/or checking. Burned elements include scapula (N=5), humerus (N=1), radius (N=1), carpal cuneiform (N=1), metacarpal (N=1), tibia (N=2), astragalus (N=3), phalange 1 (N=2), phalange 2 (N=4) and phalange 3 (N=1). Twenty-one identified bones also exhibited macroscopic evidence of butchering in the form of cut and/or chopping marks. A wider variety of elements exhibit butchering than burning, and include: mandible fragments (N=3), cervical vertebra (N=1), lumbar vertebra (N=1), scapula (N=4), humerus (N=2), radius (N=1), ulna (N=1), tibia (N=1), metatarsal (N=3), calcaneus (N=2), astragalus (N=1) and phalange 2 (N=1). Four of the scapulae and one of the astragali exhibit evidence of both burning and butchering. Several large mammal rib fragments in the unidentifiable bone category also exhibited butchering marks and are most likely *Bison bison*, but could not be positively identified. Worked bone is discussed in a later section of this report.

Odocoileus sp.

The ranges of both *O. virginianus* and *O. hemionus* overlap in the vicinity of the Lower Grand site (Gilbert 1990). Due to the condition of the bone and similarities within the genus *Odocoileus*, it was not satisfactorily determined whether one or both species are represented. Identifiable elements from this genus were sparse, and limited to two scapulae, one mandible, an antler tine fragment and a single maxillary first premolar. Table 18, below, summarizes the identified *Odocoileus* elements.

Table 18. Identified *Odocoileus* sp. Elements from the Lower Grand Site.

<i>Odocoileus</i> sp.				
ELEMENT	Left	Right	Indeterminate Side	Minimum Number of Individuals
Scapula		2		2
Mandible	1			1
First maxillary premolar	1			1

The minimum number of individuals represented from the excavations is two, based on the presence of the two right scapulae. Both scapulae and the mandible exhibited cut marks indicative of butchering. None of the identified

Odocoileus remains were found to have been burned. Again, due to the small area of the site represented by the 1984 excavations and the lack of specific data from previous investigations, no estimates of available meat or kilocalories were attempted.

Antilocapra americana

A single pillared tooth fragment was identified as *Antilocapra americana*. No other remains were positively identified to this species.

Odocoileus /Antilocapra

Nine specimens were cataloged as *Odocoileus/Antilocapra*. These specimens were within the size ranges of both genera, but lacked sufficient diagnostic features for positive identification. Table 19, below, summarizes those elements identified as *Odocoileus/Antilocapra*.

One tibia exhibited evidence of burning. Butchering marks were found on one humerus; and one metapodial awl and a worked second phalange are recognizable as *Odocoileus* or *Antilocapra* elements.

Table 19. Identified *Odocoileus/Antilocapra* Elements from the Lower Grand Site.

<i>Odocoileus/Antilocapra</i>				
ELEMENT	Left	Right	Indeterminate Side	Minimum Number of Individuals
Astragalus	1			-
Femur		1		-
Metapodial (tool)			1	-
Metatarsal			1	-
Tibia	1	1		-
Humerus	1			-
Ulna shaft		1		-

Unmodified Bone Fragments

Tables 20 and 21 list the unmodified, unidentifiable bone fragments (burned and unburned) recovered from the 1984 excavations at the Lower Grand site.

Table 20. Bone Fragments (Burned) from the Lower Grand Site.

CATALOG NUMBER	# BONE FRAGMENTS	WEIGHT BONE FRAGMENTS (g)	CACHE PIT #
55	23	20.40	1
67	4	0.10	1
1	7	2.50	2
02	1	0.70	2
07	164	779.84	2
48	32+	97.30	2
49	4	10.00	2
42	3	2.00	3
43	5	11.40	3
70	7	0.20	3
30	2	3.80	4
79	3	6.80	4
82	5	8.30	5
84	9	44.20	5

Table 21. Bone Fragments (Unburned) from the Lower Grand Site.

CATALOG NUMBER	# BONE FRAGMENTS	WEIGHT BONE FRAGMENTS (g)	# SMALL MAMMAL FRAGMENTS	WEIGHT SMALL MAMMAL FRAGMENTS (g)	CACHE PIT #
55	250	2043.10	1	1.2	1
56	13	15.90			1
67	20	14.40	2	<0.1	1
1	11	4.90			2
7	1245+	6133.60	19	16.7	2
48	54	261.60			2
42	55	245.80	2	1.8	3
69	19	0.10			3
70	50+	18.10			3
79	58	953.00			4
84	156	1316.50	1	0.4	5
85	2	2.70			5
0	4	15.00			Surface ?

Worked Bone and Antler

Twenty-four fragments of worked bone were recovered from the Lower Grand site, with refitted specimens reducing the final worked bone count to 20 artifacts. Scapula hoe fragments comprise the majority of the worked bone; two bone awls, a bone awl preform or manufacturing waste and a possible gaming piece were also identified, along with a single antler tine tool. These artifacts are described below. Measurements were taken to the nearest millimeter on fragmented specimens and to the nearest 0.1 millimeter for the few artifacts which are intact.

Scapula Hoe Fragments (Plate 16)

Catalog 85-2-7-B72 (Cache Pit #2)

Length: 239 mm Width: 105 mm Thickness: 64 mm

Description: This hoe was fashioned from a left *Bison bison* scapula. Roughly one-third of the blade remains (Plate 16); the glenoid fossa and coracoid process are essentially intact, and the spine has been removed. A hole roughly 2 cm in diameter has been punched from the lateral side through the blade. The blade is broken across the hole, and it is not possible to determine whether it was made to facilitate hafting of the tool, or as a repair. Chop marks, cut marks and polish are present on this tool; some weathering is evident on the articular end of the bone.

Catalog 85-2-7-B73 (Cache Pit #2)

Length: 193 mm Width: 61 mm Thickness: 50 mm

Description: This specimen is formed from a left *Bison bison* scapula. The glenoid fossa and coracoid process are intact, save for some weathering. Roughly one-third of the blade and cranial border are intact; the spine has been removed.

Catalog 85-2-7-B74 (Cache Pit #2)

Length: 215 mm Width: 94 mm Thickness: 18 mm

Description: The lateral cortex of this right *Bison bison* scapula has been severely eroded, exposing the marrow cavity over most of the surface. Cut marks and chop marks are present on the ventral surface; polish is visible on the center of the blade near the vertebral border.

Catalog 85-2-7-B76 (Cache Pit #2)

Length: 179 mm Width: 51 mm Thickness: 26 mm

Description: A right *Bison bison* scapula is represented by this artifact (Plate 16). A portion of the caudal border and the base of the spine, which has been removed, are present. Chop marks, cut marks and polish are present on the distal end of the caudal border.

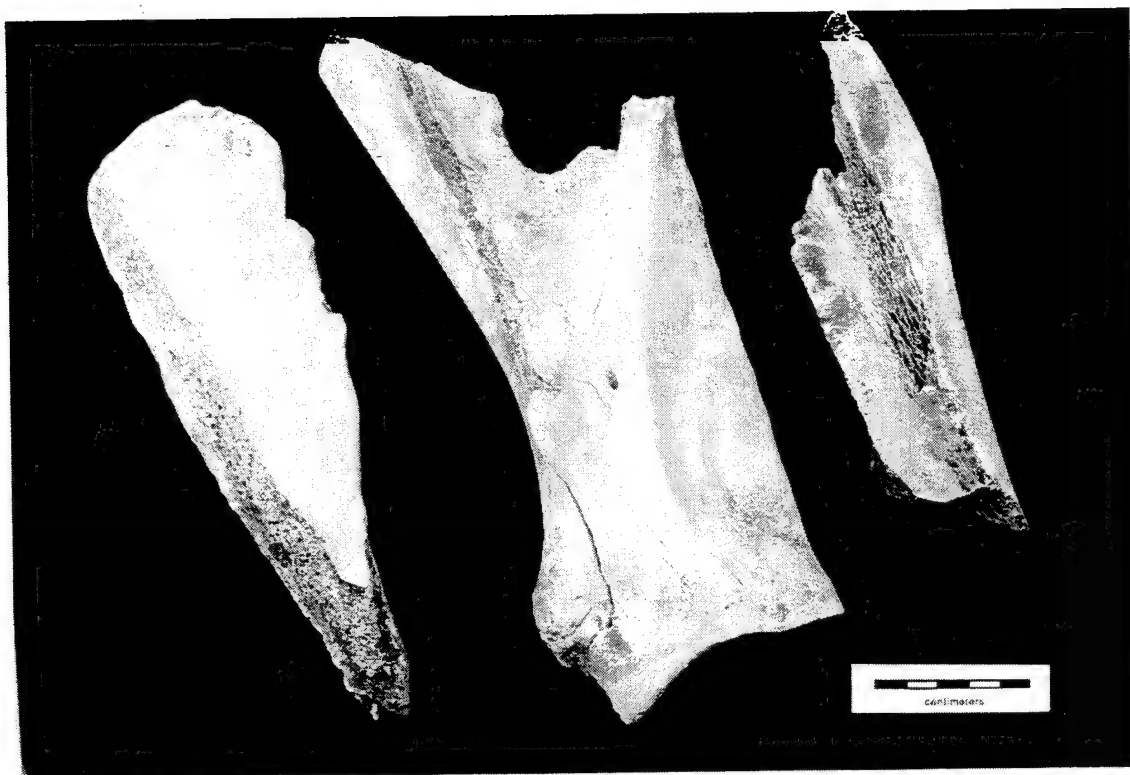


Plate 16. Lower Grand site: scapula hoe fragments (l-r: 85-2-20-B1, 85-2-7-B72, 85-2-7-B76).

Catalog 85-2-7-B77 + 85-2-7-B80 (Cache Pit #2)

Length: 113 mm Width: 44 mm Thickness: 7 mm

Description: A large mammal scapula, probably *Bison bison*, was utilized to manufacture this tool. Due to its fragmented nature and heavy weathering, it was not possible to side the element. The central portion of the vertebral border and a portion of the caudal or cranial border, which is worn and thinned, are present. Polish is evident along the vertebral margin and possible cut marks are present on the blade.

Catalog 85-2-7-B78 (Cache Pit #2)

Length: 42 mm Width: 40 mm Thickness: 9 mm

Description: This relatively small fragment is from either the cranial or caudal border of a large mammal scapula. Cut marks and chop marks are present and the thinned margin exhibits heavy polish.

Catalog 85-2-7-B79 (Cache Pit #2)

Length: 39 mm Width: 24 mm Thickness: 4 mm

Description: This specimen is from the margin of a large mammal scapula. It exhibits several cut marks and slight polishing on the natural margin of the bone.

Catalog 85-2-7-B81 + 85-2-7-B83 (Cache Pit #2)

Length: 102 mm Width: 105 mm Thickness: 9 mm

Description: A portion of the vertebral border and the cranial or caudal border of a large mammal scapula are present on this specimen. The vertebral border has been thinned and exhibits heavy polish; cut marks are visible on both faces of the blade.

Catalog 85-2-7-B82 + 85-2-7-B84 + 85-2-7-B125 (Cache Pit #2)

Length: 135 mm Width: 57 mm Thickness: 9 mm

Description: These three fragments represent the central section of the cranial or caudal border from an unidentified (large mammal) scapula. Cut and chop marks indicate efforts to thin the margin; evidence of polish or wear was not observed.

Catalog 85-2-7-B85 (Cache Pit #2)

Length: 53 mm Width: 30 mm Thickness: 9 mm

Description: This large mammal scapula fragment retains the cranial or caudal angle, the cranial or caudal margin and a portion of the vertebral margin. All margins have been thinned; cut marks and heavy polish are present.

Catalog 85-2-20-B1 (Cache Pit #4)

Length: 210 mm Width: 67 mm Thickness: 20 mm

Description: This *Bison bison* scapula could not be sided due to a lack of diagnostic landmarks (Plate 16). The vertebral border, the cranial or caudal angle and the cranial or caudal margin are present. The cranial or caudal margin has been thinned, and with the vertebral margin, exhibits heavy wear and polish. Cut marks, chop marks and rodent gnawing are evident on the specimen.

Catalog 85-2-48-B2 (Cache Pit #2)

Length: 236 mm Width: 108 mm Thickness: 58 mm

Description: A right *Bison bison* scapula is represented by this tool. The glenoid cavity, the base of the spine and roughly one-third of the blade are present. Cut marks, chop marks and polish are present on the specimen.

Catalog 85-2-84-B18 (Cache Pit #5 [North])

Length: 54 mm Width: 23 mm Thickness: 7 mm

Description: Cut marks, striations and polish are present on this small fragment of bone from the central blade of a large mammal scapula.

Catalog 85-2-84-B21 (Cache Pit #5 [North])

Length: 26 mm Width: 55 mm Thickness: 11 mm

Description: The base of the spine is present on this fragment from the central blade of a large mammal scapula. Cut marks are present; the marrow cavity at the base of the spine is worn smooth from use and polish is present over much of the cortex.

Catalog 85-2-84-B23 (Cache Pit #5 [North])

Length: 54 mm Width: 31 mm Thickness: 9 mm

Description: This specimen also represents a fragment from the central blade of a large mammal scapula. The spine has been removed; cut marks, chop marks and polish are evident on this artifact.

Bone Awls (Plate 17)

Catalog 85-2-22-B1 (Cache Pit #4)

Length: 104.7 mm Width: 10.4 mm Thickness: 7.9 mm

Description: This specimen was produced from the cortex of a large mammal long bone (Plate 17). The proximal end of the tool is convex and results from the bone splinter being grooved and snapped. The distal end of the tool is pointed; slight polish is present on the surface of the tool.

Catalog 85-2-23-B1 (Cache Pit #4)

Length: 92.7 mm Width: 16.2 mm Thickness: 11.8 mm

Description: This tool is formed from the distal end of an *Odocoileus* or *Antilocapra* metapodial (Plate 17). The bone was split medially along the vascular groove and the shaft was ground to a point; the distal end of the bone forms the proximal end of the awl. The artifact exhibits heavy polish from the point to near the articular surface.

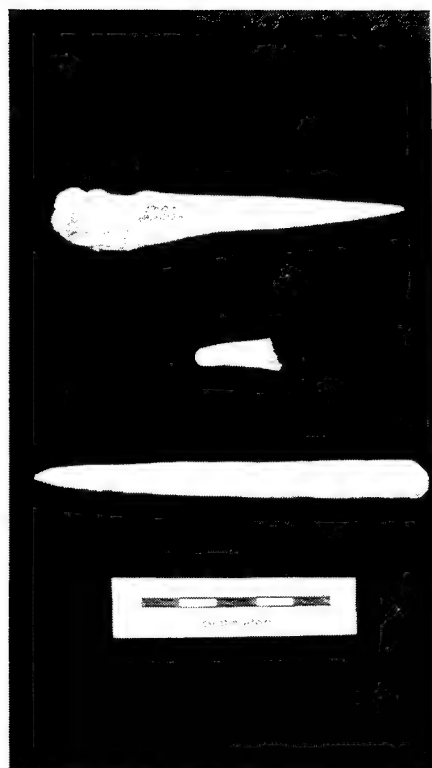


Plate 17. Lower Grand site: bone awls (top 85-2-23-B1, bottom 85-2-22-B1); antler tine (middle 85-2-24-B1).

Catalog 85-2-84-B3 (Cache Pit #4)

Length: 49.7 mm Width: 19.2 mm Thickness: 13.9 mm

Description: This tool is formed from the distal end of an *Odocoileus* or *Antilocapra* metatarsal. The bone was grooved from both the anterior and posterior surfaces and split medially. No additional work was performed, and it is not known whether the specimen represents an awl preform or manufacturing waste. Due to the short length of the fragment, manufacturing waste or possibly a manufacturing failure are suggested.

Gaming Piece

Catalog 85-2-48-B8 (Cache Pit #2)

Length: 26.4 mm Width: 10.8 mm Thickness: 13.1 mm

Description: The second phalange from an *Odocoileus*/*Antilocapra*-sized mammal was modified to create this artifact. The distal end of the bone has been removed to expose the marrow cavity. Slight polish is seen along the margin of the cavity; the remainder of the bone appears to be unmodified, although weathering may obscure faint cut marks. One-half of a 'pin and cup' gaming piece is suggested.

Antler Tine (Plate 17)

Catalog 85-2-24-B1 (Cache Pit #3)

Length: 22.8 mm Proximal diameter: 8.5 mm Distal diameter: 5.8 mm

Description: This short antler tine fragment is consistent with *Odocoileus* sp. antler. The proximal end appears to have been snapped, perhaps accidentally; grooves or other indications of intentional preparation prior to breaking are lacking. The distal end of the fragment exhibits small step fractures and sharpening bevels consistent with tine pressure flaking tools utilized by the researcher in replicative studies.

PREVIOUS STUDIES OF MODIFIED BONE FROM THE LOWER GRAND SITE
(summarized from Falk and Ahler 1988:67)

A modified bone and antler sample from the 1962-1964 and 1969 excavations at the Lower Grand site includes all tools, tool fragments, preforms and manufacturing debris. The bones of a wide variety of birds (white pelican, geese, ducks, hawks, and eagles) and mammals (cottontail, white-tailed jack rabbit, beaver, porcupine, gray wolf/domestic dog/coyote, swift fox, elk or wapiti, deer, pronghorn, and bison) are represented in the collection. A description of these remains was prepared by Falk (1986), and an inventory of the bone and antler artifacts is provided in Falk and Ahler (1988:171, Table F.2). The most numerous items include digging tools (N=200); bone awls/punches, including preforms and manufacturing debris (N=242); cutting/scraping tools (N=85); and antler and bone flaking tools (N=56).

SMALL MAMMAL BONE
by Holmes Semken

A total of 34 small mammal bone specimens from the 1984 excavation at the Lower Grand site were sent to Dr. Holmes Semken for identification. These identifications are summarized in Table 22. The animals represented in the sample include *Canis* sp. (dog, wolf, coyote), *Vulpes* sp. (kit fox), *Sylvilagus* sp. (rabbit), *Lepus* sp. (jack rabbit), *Geomyid* (pocket gopher), and *Cynomys ludovicianus* (prairie dog).

FISH BONE
Identified by Lynn Alex

Three identifiable fish bones were recovered from the 1984 salvage excavations at the Lower Grand site.

Catalog 85-2-42-B14 (Cache Pit #3)
Cleithrum broken (rt). *Ictaluridae* (catfish and bullheads).

Catalog 85-2-84-B12 (Cache Pit #5 [North])
Post-temporal, partially broken (rt). *Ictalurus punctatus/furcatus* (channel catfish or blue catfish).

Catalog 85-2-7-B101 (Cache Pit #2)
Pectoral spine, broken (rt). *Ictaluridae* (catfish and bullheads).

REPTILE BONE
Identified by Kerry Lippincott

One identifiable reptile bone was recovered from the 1984 salvage excavations at the Lower Grand site.

Catalog 85-2-7-B94 (Cache Pit #2)
Costal, *Testudinata* (turtle).

BIRD BONE
Identified by John Cordell

One identifiable avian bone was recovered from the 1984 salvage excavations at the Lower Grand site.

Catalog 85-2-55-B49 (Cache Pit #1)
Mandible, portion of right side. *Passeriformes* species; *Passeres* (songbird).

Table 22. Identified Small Mammal Bone Elements from the Lower Grand Site.

CONTEXT	CATALOG # 85-2-XX-B#	IDENTIFICATION
Cache Pit #4 (south)	78-B1	<i>Canis familiaris</i> L. M ¹
	78-B2	<i>Canis familiaris</i> L. I ³
	78-B3	<i>Canis familiaris</i> R. M ¹
	78-B4	<i>Canis familiaris</i> L. C ¹
	79-B3	<i>Canis</i> cf. <i>familiaris</i> . L. maxilla fragment and molar
	79-B4	<i>Canis</i> sp. Probably R. radius
	79-B5	? <i>Canis</i> . R. parietal
	79-B6	Canis-size rib
	79-B7	Canis-size rib
	79-B40	<i>Canis</i> occipital/basioccipital
Cache Pit #5 (north)	84-B2	<i>Canis familiaris</i> . R. ilium
	84-B5	<i>Canis</i> cf. <i>familiaris</i> . Caudal vertebra fragment
	84-B7	? <i>Canis familiaris</i> . Proximal metatarsal
	84-B11	? <i>Lepus</i> . R. tibia shaft-juvenile
	84-B27	Canis-size rib
	84-B29	<i>Canis familiaris</i> . L. mandible
Cache Pit #2	7-B86	<i>Cynomys ludovicianus</i> . L. humerus
	7-B87	cf. <i>Sylvilagus</i> . L. ulna
	7-B88	<i>Canis familiaris</i> . L. metatarsal V
	7-B89	<i>Canis familiaris</i> . L. metatarsal IV
	7-B90	<i>Canis familiaris</i> . L. metatarsal III
	7-B91	<i>Canis familiaris</i> . L. metatarsal II
	7-B92	<i>Canis familiaris</i> . L. metatarsal I
	7-B93	Prob <i>sylvilagus</i> . R. femur juvenile
	7-B100	<i>Geomyid</i> (pocket gopher). R. humerus
	7-B113	Canis-size rib
	7-B118	<i>Vulpes</i> sp. L. M ₁
	7-B137	<i>Canis familiaris</i> . L. ilium
Cache Pit #3	42-B3	cf. <i>sylvilagus</i> . L. innominate
	42-B10	<i>Canis</i> cf. <i>familiaris</i> . Distal end of proximal phalanx
Cache Pit #1	55-B2	<i>Canis</i> cf. <i>familiaris</i> . R. scapula
	55-B40	<i>Canis</i> cf. <i>familiaris</i> . thoracic vertebra
	55-B45	Canis-size rib
	55-B46	Canis-size rib

PREVIOUS WORK WITH VERTEBRATE ASSEMBLAGES FROM THE LOWER GRAND SITE
(summarized from Falk and Ahler 1988:68)

Consideration of the full vertebrate assemblage recovered from the 1962-1964 and 1969 excavations at the Lower Grand site by Falk (1986) provides a description of the remains, an analysis of the patterns of vertebrate use and a discussion of between-site and within-site variability. The results of this work indicate that vertebrate use is consistent with the general Plains Village pattern which featured an extensive exploitation of large herbivores (especially bison; see Chomko 1976; Falk 1977a, 1977b; Falk et al. 1980, 1984; Gilbert 1969; Parmalee 1979) and, to a lesser extent, a variety of smaller forms. There is some variation in the use of this latter group of animals which includes fish (especially catfish, goldeye and small chubs), birds (grouse), large canids (domestic dog and gray wolf), and small mammals (lagomorphs, ground squirrels and swift fox), reflecting, in part, the character of the local environment/habitat, and seasonal fluctuations in local abundance and availability of certain species.

A number of specialized studies on the 1962-1964 and 1969 collections from the Lower Grand site have been completed with Falk's assistance and/or direction. These studies include analyses of small rodent and insectivore remains (Semken 1976, 1983:198-199; Semken and Falk 1980, 1987; Semken and Foley 1979), large canid remains (Morey 1986) and fish remains (Morey 1984; Peterson 1980).

A description and analysis of the human vertebrate remains from the Lower Grand site has also been completed (Smith 1972). A single infant burial (?) was recorded at the site.

INVERTEBRATE MATERIALS
by Peter Winham

Shell

The small amount of shell recovered from the 1984 excavations at the Lower Grand site consisted almost entirely of small fragments of freshwater mussels. The shell material is summarized in Table 23.

Table 23. Shell Recovered from the 1984 Excavations at the Lower Grand Site.

CATALOG #/ CONTEXT	DESCRIPTION	WEIGHT OF SPECIMEN(S) (g)
85-2-0 (Surface)	Freshwater mussel shell fragments (3)	3.1 g
85-2-7 (Cache Pit #2)	Freshwater mussel shell fragment - weathered	0.1 g
85-2-30 (Cache Pit #4)	Freshwater mussel shell fragment - mineralized?	0.4 g
85-2-46 (Cache Pit #3)	Freshwater mussel shell fragment	0.3 g
85-2-48 (Cache Pit #2)	Freshwater mussel shell fragment - weathered	0.7 g
85-2-53 (Cache Pit #2)	Freshwater mussel shell fragment	0.9 g
85-2-67 (Cache Pit #1)	Freshwater mussel shell fragments (4) - burned	<0.1 g
85-2-67 (Cache Pit #1)	Terrestrial snail fragment	<0.1 g
85-2-77 (Cache Pit #4)	Freshwater mussel shell fragments (9)	3.2 g
85-2-128 (Cache Pit #4)	Freshwater mussel shell fragment - weathered	1.4 g

Insects

Fragmentary insect remains were observed in the flotation samples and are summarized in Table 26, under seeds.

**PREVIOUS WORK WITH INVERTEBRATE ASSEMBLAGES FROM THE LOWER GRAND
SITE** (summarized from Falk and Ahler 1988:68-69)

The sample of invertebrate materials recovered from the 1962-1964 and 1969 excavations at the Lower Grand site includes freshwater mussels, gastropods and insect exoskeleton debris. Primary attention was directed toward analysis of the bivalve materials.

A preliminary study of unmodified bivalves was completed by Robert Warren in 1972 (Warren 1972, 1973). The 651 identified bivalves from the Lower Grand site appear to have been collected primarily from the Grand River, perhaps during the late summer or early fall.

Insect remains were recovered from a large undercut pit (Feature 102) adjacent and exterior to House 12 at the Lower Grand site; nearly all of the specimens were burned. These materials were identified by Carl Falk with assistance from the staff of the Department of Entomology, University of Missouri. Members of the Order Coleoptera (beetles, weevils) dominated the sample examined; ant (*Formica* sp.) and moth or butterfly larvae (Order Lepidoptera) were also recorded. Identified Coleoptera include dermestid and skin beetles (Families Dermestidae and Scarabaeidae, respectively; these insects feed on dried animal

and/or plant remains), ground and ladybird beetles (Families Carabidae and Coccinellidae, respectively; both are predators), and snout and darkling beetles (Families Curculionidae and Tenebrionidae, respectively; these beetles are herbivores).

SOIL SAMPLES: FLOTATION AND SORTING

by Peter Winham

Ten catalog numbers relate to materials recovered from the fine water screening and flotation of soil samples undertaken in 1989 (Winham 1989). These are summarized in Table 24.

The recovery process utilized in 1989 involved the water screening of soil samples first through a 2 mm mesh screen into a large container. The flot was then recovered from that container by poring it through a 1 mm mesh screen. This flot is defined as the "small flot." The residue collected in the 2 mm mesh screen was then floated, and the flot recovered from that process is defined as the "large flot." The remaining residue in the 2 mm mesh screen was dried and bagged as the "unsorted residue."

Table 24. Samples from the Lower Grand Site Processed
Using Fine Water Screening and Flotation.

CATALOG #	CONTEXT	DESCRIPTION
1	Cache Pit #2	Previously preliminarily sorted residue
65+71	Cache Pit #1	Small flot
66+72	Cache Pit #1	Large flot
67+73	Cache Pit #1	Unsorted residue
68	Cache Pit #3	Small flot
69	Cache Pit #3	Large flot
70	Cache Pit #3	Unsorted residue

All small and large flot and previously unsorted residue was sorted during the current study using a hand lens. Materials were separated into artifact (lithics, daub), bone, shell, charcoal, and seed categories.

In addition to the hand sorting, a sample of the flot was screened under a binocular microscope. This procedure revealed some possible insect remains and some unidentifiable miscellaneous items. Table 25 summarizes the results of the flotation analysis.

Table 25. Summary Results of the Study of the Fine Water Screening and Flotation Residues from the Lower Grand Site.

	CACHE PIT #1	CACHE PIT #2	CACHE PIT #3
Observed:			
Small charcoal	X	X	X
Bone	X	X	X
Lithic	X		X
Daub	X		
Shell	X		
Chenopodium	X	X	X
Other Seeds	X	X	X
Insect remains	X	X	X

In every case, the charcoal recovered consisted of small or minute fragments. Total quantities of charcoal from any single context were less than 5.0 g. The daub or burned clay fragments from Cache Pit #1 consisted of 11 pieces weighing a total of 4.4 g. The other materials recovered are described within the appropriate analytical chapters.

BOTANICAL REMAINS: SEEDS

Identifications by Brent Turnipseed

Although seeds were observed in the flotation samples, only *Chenopodium* was present in any quantity. Other seeds occurred in isolated instances. Insect fragments were also present, as well as some items that are clearly intrusive. Extraction of seeds and insect parts was undertaken by Annalisa Olson at ALAC. In the case of three samples (Flot-1, Flot-65, Flot-71), the remaining unsorted flot was also examined by Brent Turnipseed, Director of the Seed Testing Laboratory at South Dakota State University, Brookings. An extensive comparative collection was used to make the identifications. The results of the seed identifications and analysis of flotation samples are presented in Table 26, below.

Table 26. Seed Identifications/Flotation Analysis from the Lower Grand Site.

SAMPLE #	LOCATION	IDENTIFICATION/COMMENTS
1	Cache Pit #2	<i>Chenopodium</i> c.f. <i>gigantospermum</i> (this species identified by Gary Larson, SDSU)
26	Cache Pit #4	<i>Cucurbita</i> spp., probably a squash seed <i>Prunus</i> spp., probably chokecherry
65	Cache Pit #1	<i>Chenopodium</i> spp., 8 seeds (4 broken pieces of <i>Chenopodium</i>)
68A	Cache Pit #3	<i>Chenopodium</i> spp., 5 seeds (remainder broken)
68B	Cache Pit #3	Insect fragments
68C	Cache Pit #3	1 <i>Digitaria</i> spp. (crabgrass). Remainder were <i>Chenopodium</i> spp., and broken pieces. (This was the only <i>Digitaria</i> seed found in all the samples and is possibly intrusive. It was not charred, but retained its original color. There was no pubescence on the seed; typically crabgrass has very pubescent seeds.)
69A	Cache Pit #3	<i>Prunus</i> spp., probably chokecherry
69B	Cache Pit #3	Insect body part
69C	Cache Pit #3	<i>Chenopodium</i> spp. (1 whole, 1 broken)
71	Cache Pit #1	<i>Chenopodium</i> spp., 8 seeds (1 hulled, 1 empty hull)
72	Cache Pit #1	<i>Prunus</i> spp., probably chokecherry, charred pit
Flot 1	Cache Pit #2	Hundreds of <i>Chenopodium</i> spp. seeds. 1 grass caryopsis, looks like a <i>Bromus</i> spp. Charred wood, insect parts, inert material.
Flot 65	Cache Pit #1	3000-4000 <i>Chenopodium</i> spp. (probably 1/3 broken) 7 <i>Polygonum</i> spp., (smartweed or knotweed species? - not well preserved). 1 <i>Agropyron cristatum</i> - crested wheatgrass, intrusive. This species was introduced into this country within the last 100 years. 1 <i>Helianthus</i> spp. charred very badly and disintegrating. Insect parts, skeletal parts, snails? Needles from some evergreen tree or shrub? Plant root material and charred wood.
Flot 71	Cache Pit #1	400-500 <i>Chenopodium</i> spp. Insect parts, skeletal remains. Needles from some evergreen tree or shrub? Plant root material and charred wood.

PREVIOUS WORK WITH BOTANICAL REMAINS FROM THE LOWER GRAND SITE
(summarized from Falk and Ahler 1988:69)

Systematic examination of the botanical debris associated with the village deposits recovered from the 1962-1964 and 1969 excavations at the Lower Grand site included detailed studies of seed and cultigen remains (Nickel 1974, 1977, 1988), wood identification (Weakley 1971) and a preliminary evaluation of pollen (Vehik 1971). The pollen study was exploratory in nature and yielded no useful results.

All seeds and cultigens have been examined in detail by Robert K. Nickel. Charred and uncharred wood samples were examined by Weakly (1971). Weakly's identifications, however, were completed primarily with the aid of a hand-held magnifying lens (15x) and subsequent examination of some specimens suggested to Nickel and Falk that the low-power magnification was insufficient to accurately identify all materials.

All of the species identified from the 1984 samples (Table 26) had been previously recovered from the site (see Nickel 1988) with the exception of the species *Digitaria* and *Agropyron cristatum* which are probably intrusive.

MISCELLANEOUS ITEMS

by L. Adrien Hannus

A specimen reminiscent of a beadlike adornment (Catalog #85-2-64), made from the tip of a *Belemnitella* fossil (Plate 18-left), was recovered from Cache Pit #1. In addition, a small pipestone pipe bowl (?) fragment (Catalog #85-2-0) was recovered from the surface of the site (Plate 18-right).

Catalog 85-2-64 (Cache Pit #1)

Length: 14.5 mm Width: 7.8 mm Thickness: 4.8 mm

Material and Color: Brown chalcedony - Munsell 10YR-3/6 dark yellowish brown

Description: This item is a narrow cone-shaped object with a blunt apex (distal) end. The specimen is split longitudinally. The cross section exposure exhibits an internal furrow (channel), plus growth layers which appear similar to a tree ring sequence. The item is made from a fossil tip of the guard portion of a Cretaceous squid-like creature known as *Belemnitella*. The specimen exhibits cultural modification in the form of a groove that has been ground into the surface near the proximal end. The piece may have functioned as a beadlike adornment, sewn onto leather backing.

Catalog 85-2-0 (Surface?)

Length: 13.2 mm Width: 16.9 mm Thickness: 2.7 mm Weight: 1.3 g

Material and Color: Pipestone (Catlinite?) - Munsell 10R-3/4 dusky red

Description: This specimen is a carved cylinder of pipestone, split longitudinally. The exterior surface is shaped and polished. The interior is drilled and polished. The specimen was likely broken during production. It may be a fragment of a pipe bowl stem.

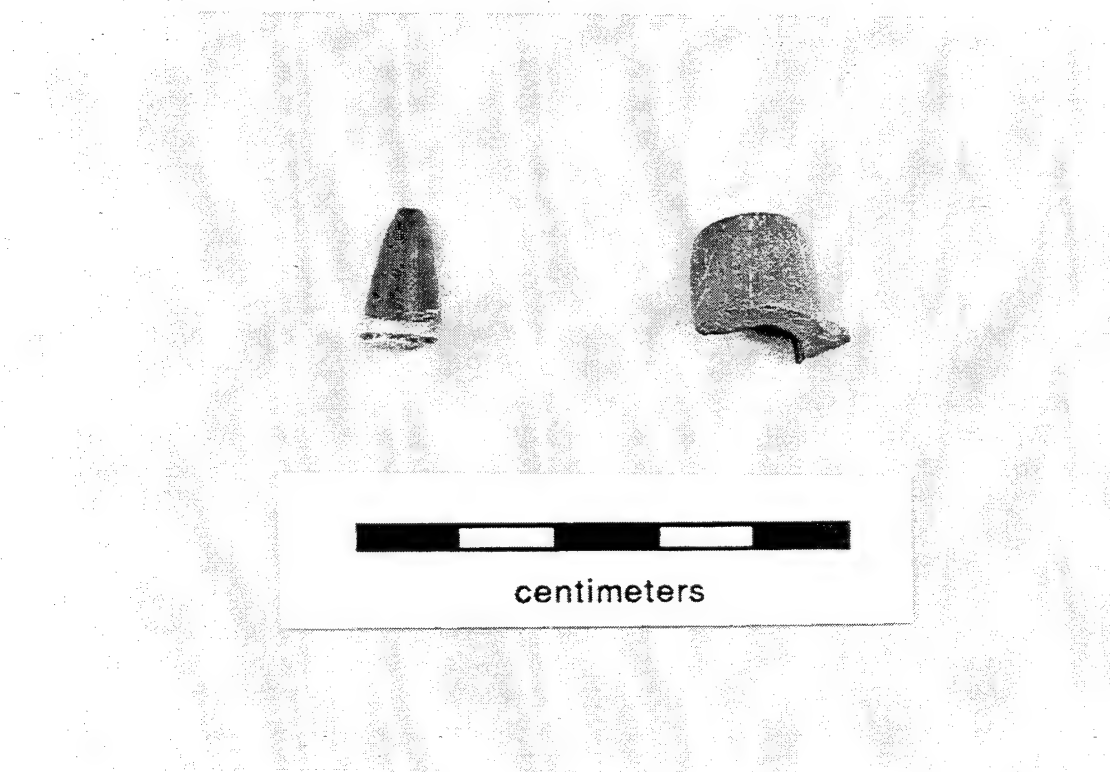


Plate 18. Lower Grand site: *Belemnitella* fossil tip (left) and pipestone pipe bowl fragment (right).

CONTEXT ANALYSES

by Peter Winham

Stratigraphy

All of the profiles relating to the 1984 investigation are drawn from the exposed eastern edge of the site (i.e., facing toward the east). No information is available concerning the exact direction that the profiles face. The records from the artifact bags indicate a Profile #6 with a south and a north cache pit. This profile was not present in the materials supplied to ALAC. However, it is assumed in this report that the south cache pit is also Cache Pit #4 and that the north cache pit is also Cache Pit #5. This assumption is based on discussions with Timothy Nowak, director of the 1984 fieldwork, who indicated that only five cache pits were excavated. It is possible, however, that the references to a north and a south cache pit, rather than referring to Cache Pit numbers 4 and 5, are referring to the northern and the southern portion of a single cache pit. Similarly, no records are available for Profiles 3, 4, 5, 7, and 9 (if they existed).

Profile #1: North Fortification Ditch

This profile (Figure 6; Plate 19) was drawn on November 1, 1984 by Timothy Nowak and Virginia Gnabasik. It shows a grayish brown (2.5Y-5/2) sod level (1) grading into a grayish brown (2.5Y-5/2) soil (2) above a light gray (2.5Y-7/2) soil (3), over a pale olive (5Y-6/3) sand (4).

On the profile (of which only a xerox copy was available), the edges of the North Fortification Ditch are shown extending to the ground surface. This is unlikely to be the case as the sod layer, at least, would post-date the silting of the ditch. The fill of the ditch (5) is described as mottled, dark grayish brown (2.5Y-4/2) soil.

The elevation on the southern end is 1629.69 ft. amsl; on the northern end it is 1628.75 ft. amsl. The base of the profile is the top of slumping material.

Profile #2: Paleosol

This profile (Figure 7) was drawn on November 1, 1984 by Nowak and Gnabasik. It shows a section of the cutbank in which a paleosol is clearly visible. Plate 20 shows the paleosol and a wooden post exposed in the cutbank (below the person and midway between the surface and the paleosol). The location of this post was not mapped (Timothy Nowak, personal communication 1995).

Layer 1	Sod, grayish brown (2.5Y-5/2)
Layer 2	Grayish brown (2.5Y-5/2) soil
Layer 3	Paleosol, light gray to gray (5Y-6/1).
Layer 4	Light gray (2.5Y-7/2) soil
Layer 5	Pale olive (5Y-6/3) sand

The base of the profile is the top of slumping material.

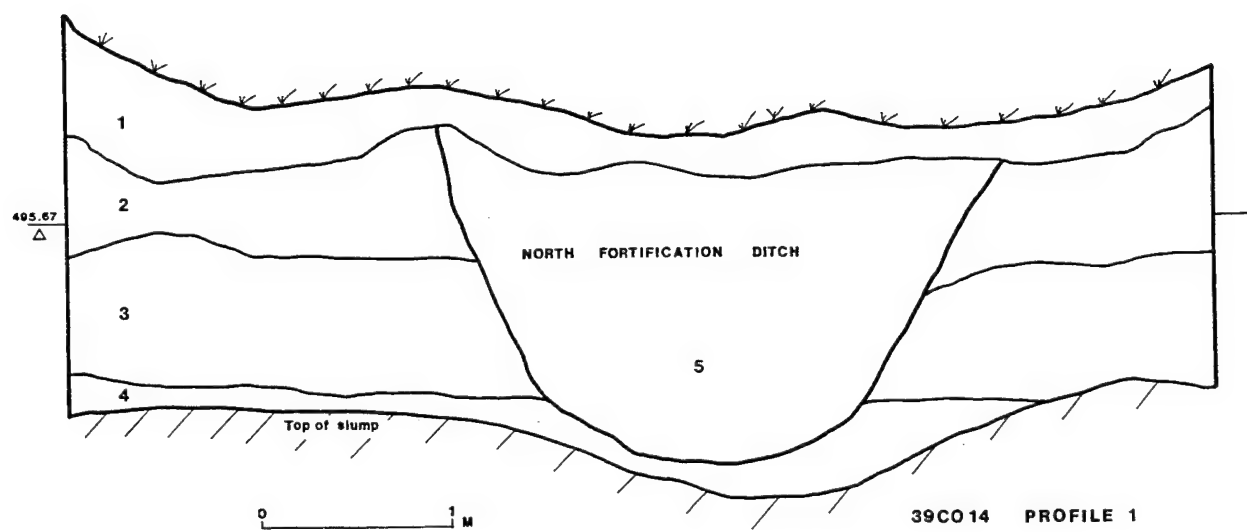
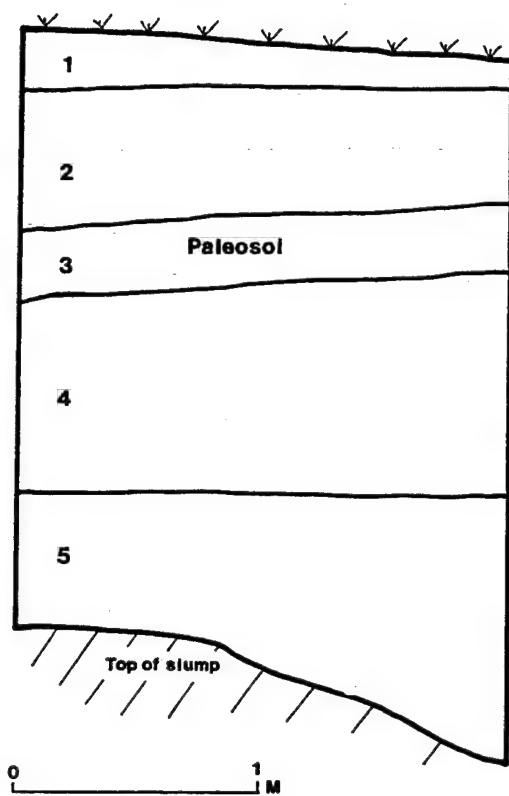


Figure 6. Profile #1: North Fortification Ditch.



39CO14 PROFILE 2

Figure 7. Profile #2: paleosol.

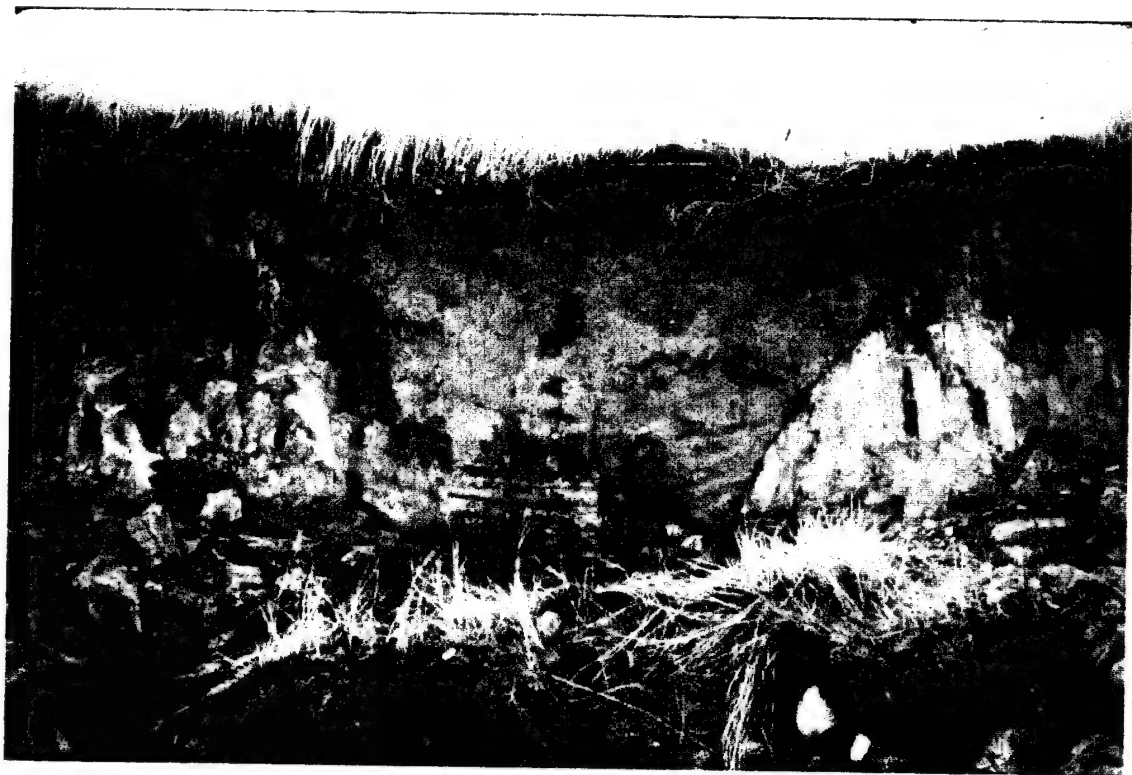


Plate 19. North Fortification Ditch exposed in cutbank in 1984, facing west.



Plate 20. View of cutbank exposed in 1984 showing a paleosol and a wooden post, facing west.

Profile #8: Cache Pits

This profile (Figure 8) was drawn between November 2 and 3, 1984 by Nowak and Gnabasik. It shows five cache pits (Plates 21-24) exposed along the cutbank, an intrusive (pothunter?) pit and a post exposed in a posthole. Rodent burrowing is also recorded.

Layer 1	Sod
Layer 2	Cultural
Layer 3	Yellow loess
Layer 4	Paleosol

Sand is recorded below the paleosol.

Cache Pits 1, 2 and 3 are all drawn as cutting through (i.e., post-dating) Layer 2, the "cultural" layer. Only the back edges of Cache Pits 4 and 5 appear to be present; therefore, the stratigraphic relationship of these pits to pits 1-3 cannot be determined. The post and posthole, however, are drawn as being covered by the cultural layer (Layer 2), therefore pre-dating Cache Pits 1-3 by at least the time taken for the cultural layer to have built up 30-40 cm in depth.

Profile #10: South Fortification Ditch

This profile (Figure 9) was drawn on November 3, 1984 by Nowak and Gnabasik. It shows the South Fortification Ditch fill (Layers 4-8) cut through a paleosol (Layer 10) and subsoil layers (2 and 11). The relationship to the cultural layer (Layer 9) is unclear. A sod layer (1) and a rodent burrow intrusion (3) are also depicted.

Layer 1	Sod
Layer 2	Very dark grayish brown (10YR-3/2) soil
Layer 3	Rodent burrow
Layer 4	Very dark brown (10YR-2/2) soil
Layer 5	Dark grayish brown (10YR-4/2) soil
Layer 6	Light yellowish brown (2.5Y-6/4) soil
Layer 7	Olive brown (2.5Y-4/4) soil
Layer 8	Very dark grayish brown (10YR-3/2) soil
Layer 9	Dark grayish brown (2.5Y-4/2) soil - cultural
Layer 10	Olive brown (2.5Y-4/4) soil - paleosol (gravelly layer)
Layer 11	Brown to dark brown (10YR-4/3) heavy loam grading into brown sandy loam

The base of the profile is the top of slumping material.

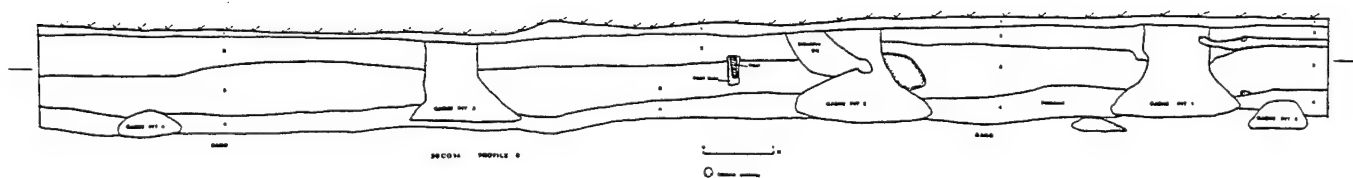


Figure 8. Profile #8: cache pits.

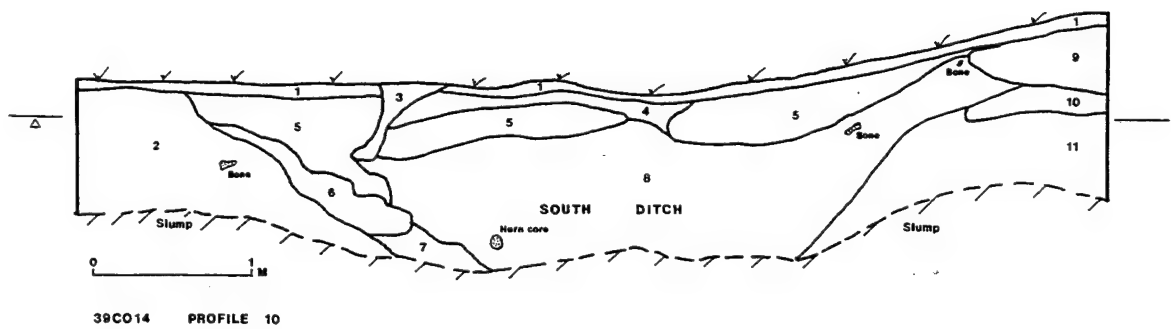


Figure 9. Profile #10: South Fortification Ditch.



Plate 21. Cache Pit #1, facing west.



Plate 22. Cache Pit #2, facing west.



Plate 23. Cache Pit #3, facing west.



Plate 24. Cache Pit #4, facing west.

Features

There are no written feature descriptions in the available site records. The following summaries are based on the profiles drawn by Nowak and Gnabasik (Figure 8) and the slides provided by Nowak. The location of these profiles relative to the features themselves is unknown. It is unlikely, therefore, that the profiles of Cache Pits #1-3 are exactly half-sections. Similarly, the ditch profiles are unlikely to be placed at right angles. The measurements, therefore, may not accurately reflect the original size and shape of these features and should only be used as approximations.

Cache Pit #1 (Plate 21)

Depth from top (base of sod) to bottom of pit: 1.35 m

Width at surface: 98 cm

Maximum width: 1.88 m

The upper 62 cm is cylindrical, and then the pit starts to bell-out.

Cache Pit #2 (Plate 22)

Depth from top (base of sod) to bottom of pit: 1.37 m

Width at surface: >82 cm

Maximum width: 1.52 m

The upper 38 cm is cylindrical, and then the pit starts to bell-out.

The southern edge of the pit has been disturbed by a recent "intrusive pit."

Cache Pit #3 (Plate 23)

Depth from top (base of sod) to bottom of pit: 1.16 m

Width at surface: 75 cm

Maximum width: 2.02 m

The upper 42 cm on the north side and 86 cm on the south side are cylindrical. The pit then starts to bell-out.

Cache Pit #4 (South Cache Pit) (Plate 24)

Only the back edge of this pit was exposed. The base of the pit lies 150 cm below the base of the sod.

Cache Pit #5 (North Cache Pit) (no photograph available)

Only the back edge of this pit was exposed. The base of the pit lies 152 cm below the base of the sod.

North Fortification Ditch

This ditch is 150 cm deep beneath a 20-30 cm thick sod layer.

The width of the ditch at the base of the sod layer is 294 cm.

The ditch profile is U-shaped.

South Fortification Ditch

The profile of this ditch did not expose the lower portion. The exposed upper portion of the ditch has an upper width of ca. 5.2 m. At 1.1 m below the ground surface the width of the ditch has decreased to 2.5 m.

Middle Fortification Ditch

No profiles were drawn of this ditch, but Nowak (personal communication, 1995) identified a photograph of the ditch as exposed in 1984 (Plate 25).

Post and Posthole (Plate 26)

The post is shown as being 10 cm in diameter and tapering to 6 cm in diameter at a depth of 34 cm below the top of the posthole. The posthole is shown extending from 28 cm - 71 cm below the base of the sod layer and being 15 cm in diameter.



Plate 25. Middle Fortification Ditch exposed in cutbank in 1984, facing west.



Plate 26. Post and posthole exposed in cutbank (shown on profile, Figure 8).

RADIOCARBON DATING

by Peter Winham

After a complete examination of the recovered materials from the 1984 excavations, in particular the flotation materials, two samples of charcoal greater than 5 grams in weight were obtained for submission for radiocarbon dating. Sample 85-2-72 consisted of charcoal recovered from the flotation of a soil sample from Cache Pit # 1 (Profile 8). Sample 85-2-41 consisted of a few charred wood fragments recovered from Cache Pit #4 (Profile 8). The laboratory results of the radiometric dating are given in Appendix C, and summarized in Table 27, below.

Table 27. Radiocarbon Determinations from Samples Recovered
in 1984 from the Lower Grand Site.

SAMPLE NUMBER	SAMPLE	$-\delta C^{14}$	AGE IN YEARS B.P.
I-17,912	85-2-72	62 ± 9	510 ± 90
I-17,913	85-2-41	33 ± 10	270 ± 80

Using the Radiocarbon Calibration Program of the University of Washington Quaternary Isotope Laboratory, these dates are calibrated as follows:

Sample 85-2-72

Radiocarbon Age

B.P. 510 ± 90

Calibrated age

cal A.D. 1426

cal A.D./B.C. are ranges obtained from intercepts (Method A):

one sigma

cal A.D. 1398-1449

two sigma

cal A.D. 1300-1516

1591-1621

Sample 85-2-41

Radiocarbon Age

B.P. 270 ± 80

Calibrated age

cal A.D. 1651

cal A.D./B.C. are ranges obtained from intercepts (Method A):

one sigma

cal A.D. 1516-1591

1621-1675

1776-1798

1943-1954

two sigma

cal A.D. 1448-1822

1833-1882

1912-1954

At one sigma these two dates do **not** overlap. The lack of agreement only furthers the difficulty in interpreting the radiocarbon dates from this site. In fact, Sample 85-2-41 is the first sample which has yielded a date that is in general agreement with the designation of the site as dating to late in the Extended Coalescent period (Lehmer 1971:119-120) and perhaps being related to the Scattered Village complex (Falk and Ahler 1988:67).

RESEARCH QUESTIONS

by Peter Winham

In the scope-of-work, three specific research questions were noted. Was there additional evidence for multiple occupations at the site? Was there evidence for lodge repair? How does the site relate to the Extended Coalescent tradition?

The 1984 excavations were limited in extent and of a "salvage" nature. No information was recovered to directly address the issue of lodge repair. The primary data came from the excavation of exposed portions of five cache pits. It is not known exactly what proportion of each feature was recovered, and direct comparisons between the cache pit assemblages must be viewed with caution. Table 28 provides the raw data for the major artifact categories from the five cache pits.

Table 28. Cache Pits 1-5: Assemblage Comparisons.

	CACHE PIT #1	CACHE PIT #2	CACHE PIT #3	CACHE PIT #4	CACHE PIT #5
CHIPPED STONE DEBITAGE					
TRSS	315	4	14	225	53
Primary-Heated	34		2	21	6
Primary-Non-heated	6		1	8	4
Secondary-Heated	20	1		25	5
Secondary-Non-heated	22	1	2	25	7
Tertiary-Heated	40	1		80	11
Tertiary-Non-heated	38	1	3	33	14
Bifacial Thinning-Heated	39			15	2
Bifacial Thinning-Non-heated	116		6	18	4
Quartzite	16	0	0	13	5
Chert	12	0	0	14	2
Brown Chalcedony	19	0	0	6	4
Chalcedony	11	0	0	47	6
Silicified Wood	2	0	0	14	2
CHIPPED STONE TOOLS					
Points	9	1	0	7	1
Scrapers	4	1	0	7	0
Bifaces	3	1	0	7	4
Knives	3	1	0	3	2
Drills/Gravers	1	2	0	0	0
Retouched Fl.	5	0	0	13	6
Utilized Flakes	8	0	0	13	1
Spokeshave	0	0	0	0	1

Table 28 (cont.)

	CACHE PIT #1	CACHE PIT #2	CACHE PIT #3	CACHE PIT #4	CACHE PIT #5
GROUND STONE TOOLS					
Hammerstones	0	0	0	2	0
Ground Stone Abraders	1	0	0	2	0
CERAMIC RIM SHERDS					
Le Beau Ware Rims	10	4	1	0	15
Akaska Ware Rims	4	5	2	5	3
MODIFIED BONE (TOOLS)					
Hoes		11		1	3
Awls				3	
Other		1	1		
UNMODIFIED BONE - IDENTIFIED ELEMENTS					
Bison	38	84	1	22	24
Deer/ Antelope	1	1	0	5	7
Canid/ cf. Canid	4	7	1	10	5
Avian	1	0	0	0	0
Reptile	0	1	0	0	0
Fish	0	1	1	0	1
UNMODIFIED BONE - FRAGMENTS					
Unburned	1812 g	6112 g	232 g	513 g	953 g
Burned	20 g	888 g	13 g	11 g	52 g
SEEDS					
<i>Chenopodium</i>	Common	Common	Common	n/a	n/a
<i>Prunus</i> spp	Yes	No	Yes	n/a	n/a
<i>Helianthus</i> spp	Yes	No	No	n/a	n/a

The impression obtained from a review of Table 28 is that Cache Pits 1, 4 and 5 are the most similar in content. Cache Pit 2 is notable for its faunal assemblage and very limited lithic inventory. Cache Pit 3, overall, has a limited assemblage. However, it is not known if this paucity is due to a limited portion of the pit being excavated or whether it reflects a pit that was not filled with midden material. While these differences suggest variability in the way the pits were utilized after being abandoned as storage caches, they do not reflect multiple occupations.

The primary data for establishing the presence of multiple occupations include diagnostic artifacts, stratigraphy and radiocarbon dates. All of the diagnostic materials recovered from the 1984 excavations relate to an Extended Coalescent occupation. Detailed examination of the ceramics suggests an occupation around A.D. 1525-1575. A few historic artifacts were noted from

previous excavations at this site. It is likely that these materials derive from the adjacent Red Horse Hawk protohistoric site and are intrusive.

The stratigraphy represented in the 1984 profiles, as noted earlier, suggests the possibility that the exposed post and posthole pre-date the cache pits, as the post and posthole appear to be sealed by 30-40 cm of cultural material, whereas the cache pits (at least pits 1, 2 and 3) are cut through this cultural layer. This circumstance would suggest some time-depth to the occupation, but does not necessarily imply multiple occupations. Indeed, nowhere does the stratigraphy indicate a lengthy abandonment and subsequent reoccupation of the site area.

Finally, the radiocarbon dates must be assessed. Two radiocarbon dates were obtained from samples recovered in 1984 (see Table 27). One sample, from Cache Pit 4, when calibrated (at one sigma), does overlap the A.D. 1525-1575 date postulated by the ceramic analyses; the other date has a calibrated age (at one sigma) that is much older. The latter date is more comparable to the four radiocarbon determinations obtained in 1973 (see Table 33, below), when the age of the site was determined to be A.D. 1354 \pm 133 B.P. The same calibration program, when applied to the 1973 dates, provides the following calibrated ages: A.D. 1398 (RL-300), A.D. 1305, 1367, 1373 (RL-301), A.D. 1433 (RL-302), and A.D. 1328, 1333, 1395 (RL-303). One possible explanation for the older dates is that the wood samples submitted for radiocarbon dating came from old timbers, perhaps recovered from a previously abandoned village to be used at the Lower Grand site.

INVESTIGATIONS AT THE LOWER GRAND SITE PRIOR TO 1984

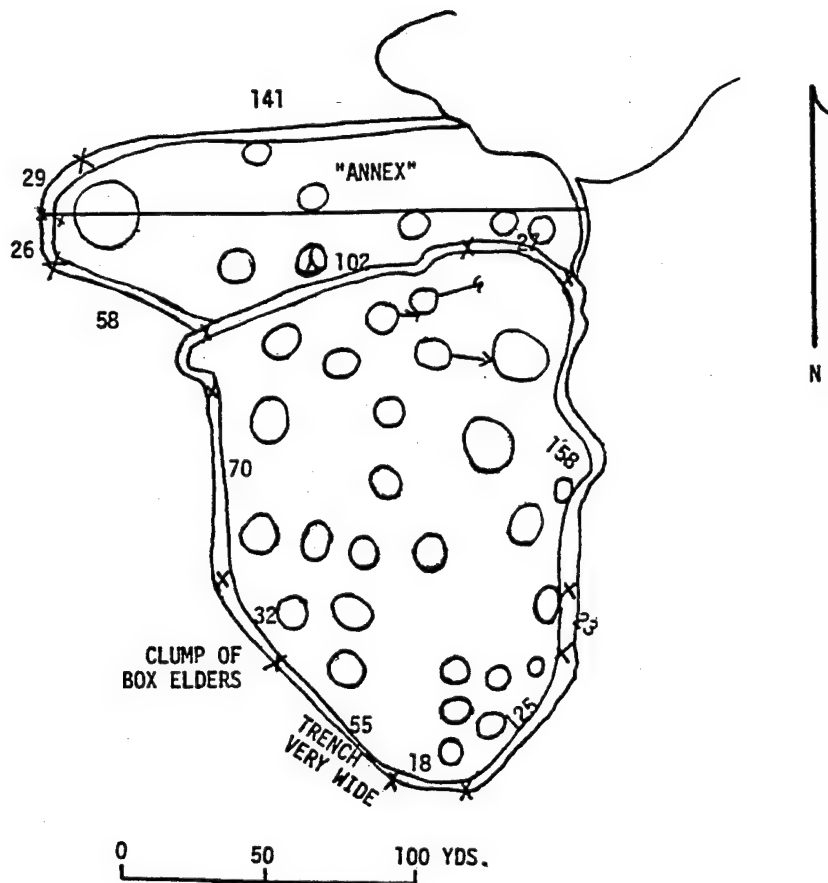
(excerpted and summarized from Falk and Ahler 1988)

The Lower Grand site (39CO14) appears to have been recorded first by W. H. Over in August of 1920; Over referred to the site as the Grand River Village. Documentation of this visit is contained in Over's notes published posthumously under the editorship of Sigstad and Sigstad (1973:57-59). Over produced a scale map (dated August 25, 1920 [misabeled Red Horse Hawk]) (see Figure 10), and conducted an unspecified number of excavations within the fortified area of the site. The location and extent of these excavations are unknown. The map, though differing in a number of respects from those produced by later investigators, clearly depicts site 39CO14 and shows a large area surrounded by a fortification ditch, broken only by the "river bank" at the northeastern corner. The southern two-thirds of the site is separated from the northern third by a ditch which links the western and eastern perimeters of the site.

Twenty-six depressions are mapped within the southern area of the site and an additional eight depressions are recorded within the northern area, labeled the "annex." Over concluded that materials recovered from the site could be attributed to the Mandan and, based on the ditch configuration, suggested that either the Mandan occupied the site at two different times or that the Arikara were responsible for later additions to the site (Sigstad and Sigstad 1973:58). Over considered the southern area of the site to be the most recently occupied.

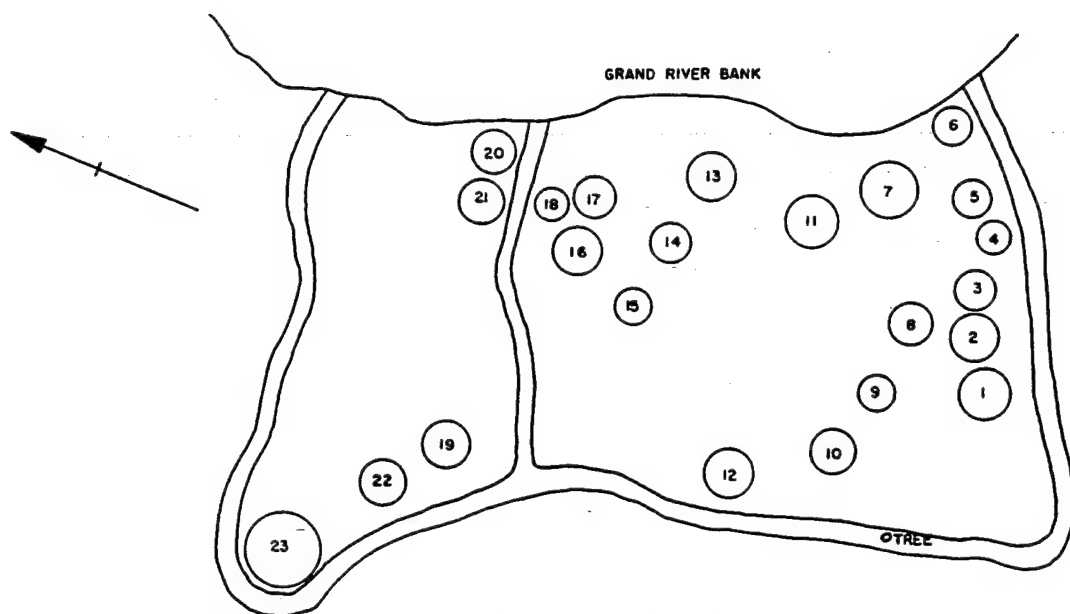
Additional excavations were conducted at the site during the summer of 1930 under the direction of Alfred W. Bowers, then affiliated with the Logan Museum, Beloit College, Beloit, Wisconsin. Reference to this work is contained in Bowers's unpublished doctoral dissertation submitted to the Department of Anthropology, University of Chicago in 1948. He has been consistent in referring to 39CO14 as the Davis site. A plan map was apparently produced and a tracing of this map, titled the "Middle Grand River Site (15SD)" is on file with the Smithsonian Institution River Basin Surveys (SIRBS) records (see Figure 11). The map is generally similar to the one produced by Over, but shows the northern, middle and southern ditches truncated by the river bank with no evidence of an eastern closure. If both the 1920 and 1930 maps are accurate, they document a significant degree of slumpage during the ten-year interval. Twenty-three depressions are shown within an area ca. 900 x 500 feet; five of the depressions are located in the northern area. Bowers noted "surface indications of a rich stone and bone culture..." and a midden deposit averaging "...two feet in depth..." (Bowers 1948:41). The location and nature of excavated tests are unknown though Bowers indicates that "...refuse mounds, fortifications and interlodge sections..." were examined. At least 489 rims and an unknown number of body sherds were recovered (Bowers 1948: Table 1, Table 3). Based, in part, on an evaluation of the ceramic sample, Bowers assigned the site to the Lower Grand focus -- a taxon comprised chiefly of sites located on the west bank of the Missouri River from the White River to the North Dakota border. Some details of this study were also included in his book *Mandan Social and Ceremonial Organization* published two years later (Bowers 1950:15-20).

RED HORSE HAWK
AUGUST 25, 1920



MANDAN VILLAGE: ONE OF THE TWO OLD INDIAN VILLAGES AT THE MOUTH OF GRAND RIVER. THIS IS THE NORTH OR NORTHWEST ONE.

Figure 10. Over's 1920 map of the Lower Grand Archeological Site (from Sigstad and Sigstad 1973:57).



MIDDLE GRAND RIVER SITE (15SD)
 MAP OF THE SITE MADE BY BOWERS IN 1930 (BOWERS
 MAP VI). THIS TRACING MADE FROM THE ORIGINAL
 BY THE MISSOURI BASIN PROJECT, SMITHSONIAN IN-
 STITUTION IN JANUARY, 1958.

0 100 200
 FEET

T-563
 2-15-58 JFY

Figure 11. Tracing made in 1958 of Bowers's 1930 map of the Lower Grand Archeological Site (on file, SARC).

Following the 1930 Logan Museum project, not much work appears to have been conducted at the site for the next three decades. W. D. Strong, and/or some of his crew, probably visited the site during the summer of 1932 while working at the nearby Leavenworth (39CO9) and Rygh (39CA4) sites (Strong 1933). A map of the general Mobridge area, presumably prepared during the 1932 investigation, has been reproduced and discussed by Haberman in conjunction with work at the nearby Travis I (39CO213) site (1982:15-24, Figure 1.4); a portion of that map is enlarged and reproduced in Figure 12.

An unauthored and undated map of the site, a copy of which was found in the SIRBS files, may also date from around the time of the 1932 investigation. The map appears to be well-made and provides considerable detail, including refuse piles adjacent to many houses, "spoil" dirt paralleling the ditch excavations and the slumping bank along the eastern site margin. The eastern ditch line shown by Over is absent. Twenty-three depressions are illustrated, but only three are located north of the middle ditch. The spatial relationships of the plotted depressions are markedly similar to those mapped in 1969 (see Figure 2). When the provenience of this map is adequately documented, it will provide an important addition to our knowledge of the site.

In 1946, Bauxar filed a partially completed River Basin Survey form, though the legal description was incorrectly recorded. A second site form was completed by Dorothy E. Fraser in August 1949; the legal description was again incorrectly reported. The site form was updated by Paul Cooper in July 1951 and the legal description was corrected. Farrell and Hoffman visited the site in August 1952 and produced a schematic rendering of the encircling ditches. Site 39CO14 was listed in the document *Appraisal of the Archeological Resources of the Oahe Reservoir North and South Dakota*, issued by the Inter-agency Archeological and Paleontological Program in May 1953 (Cooper 1953). The site was assigned a priority of A-1a, indicating that it was important and would probably be affected by bank slump and wave action expected as a result of normal reservoir operation.

In June 1962, Bowers (then with the University of Idaho, Moscow) returned to site 39CO14 to begin the first season of an intermittent three-year project for the Smithsonian Institution. A report of this work was never completed, although brief notes appear in the "Current Research" section of *American Antiquity* for each year (Vol. 28, No. 4:582; Vol. 29, No. 4:552; Vol. 30, No. 4:531) and in abstracts published in the *Plains Anthropologist* (Bowers 1963b, 1967).

The account by Falk and Ahler (1988) of the 1962-1964 and 1969 work at the Lower Grand site was based on an examination of all available records, including: specimen record sheets prepared by SIRBS laboratory personnel; "field record" sheets for three (and perhaps four) of the excavated units; field photographs (taken by Bowers and others); and "Missouri Basin Project Weekly Report" narratives for 1962-1964. The latter documents were especially helpful and, given their general unavailability, are quoted at length in the following summary discussion of Bowers's work. Site maps, excavation unit maps and unit profiles are unavailable.

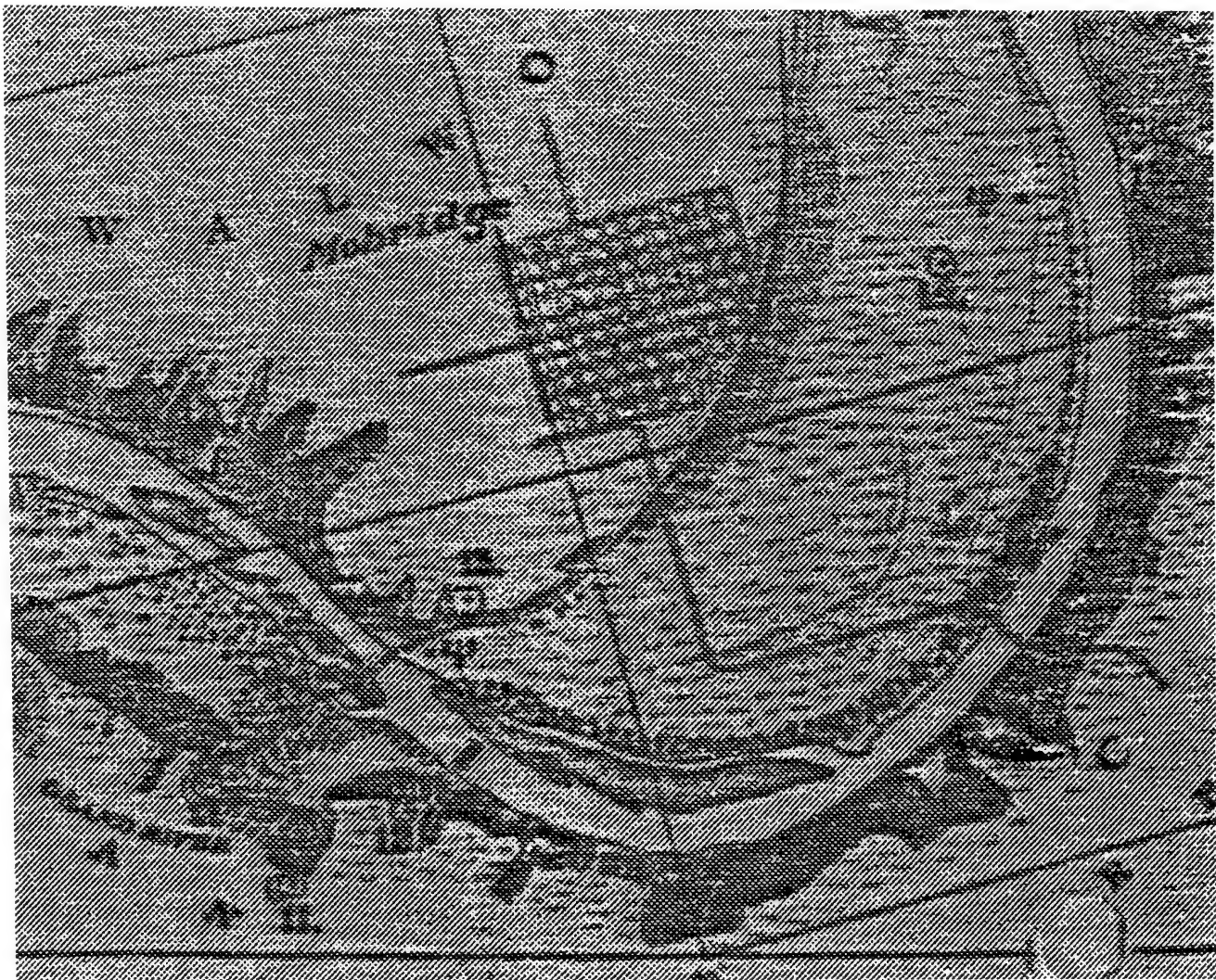


Figure 12. Enlarged section of map of village sites in the Mobridge vicinity prepared from Smithsonian Institution survey data of 1932. Locality #12 is the Lower Grand Site (from Haberman 1982:Figure 1.4).

1962 Season

Work was initiated on June 19, 1962 and continued intermittently over an eight-week period (Bowers 1962). Test excavations exposed portions of at least three houses and intersected fortification ditches in three separate areas of the site. Basic information concerning these units is summarized in Table 29.

Table 29. Summary of River Basin Surveys Field Investigations Conducted at the Lower Grand (Davis) Site, 39CO14, 1962-1964 Seasons.

1962-1964 EXCAVATION UNIT	1969 DESIGNATION	DESCRIPTION
1962		
XU-1	House 11	Two intersecting trenches excavated to expose house floor and explore midden
XU-2	House 20	Two intersecting trenches excavated to expose house floor and profile perimeter ditch
XU-3	-	Trench perpendicular to middle ditch south of House 19
XU-4	-	"Y"-shaped trench excavated at juncture of western perimeter ditch and middle ditch
XU-4A	-	Block excavation expanded to expose (rectangular?) house and other undefined structures
XU-4B	-	Block excavation expanded from XU-4 to expose fortified entrance
XU-?	House 14	Trench excavated across house depression
XU-?	-	Test unit excavated to explore midden; location unknown
1963		
XU-2	House 20	Overburden machine stripped; unit abandoned
XU-5	House 17	House depression trenched, overburden machine stripped; unit completed in 1964
XU-6	House 6	House depression trenched, overburden machine stripped; unit abandoned
XU-7	House 5	House depression trenched, overburden machine stripped; house unit, associated features excavated
XU-8	House 4	House depression trenched (?), overburden machine stripped; unit completed as XU-6 in 1964
XU-?	-	Undefined excavation between Houses 4 and 5
1964		
XU-5	House 17	House unit, associated features excavated (house exposed in 1963)
XU-6	House 4	House unit, associated features excavated (house exposed in 1963 as XU-8)

Excavation Unit I (XU-1) consisted of a trench (148 x 4 feet) extending from the bank and intersecting House 11 (Figure 2). This trench was referred to as the "east trench."

A second trench (ca. 40 x 4 feet), perpendicular to and intersecting the longer trench, was excavated within the circular house depression. The house floor and a central fire pit were exposed. Bowers (1962: Report No. 1-2, June 20) also reported that the "...edge of the lodge around the 'atutish' area had been burned." Considerable effort was invested in the excavation of the long east-west trench which exposed relatively deep midden and/or feature deposits, although difficulty was experienced in defining the base of the cultural deposits. In mid-July, Bowers commented that "Excavation Unit I cutting in from the east bank is growing increasingly complex. At the moment we are not certain what it all means but we are certain that confusion increases as new features appear" (1962: Report No. 5, July 13). A review of the 1962 specimen catalog indicates at least 32 postmolds and five pits were exposed in XU-1.

Two perpendicular and intersecting trenches (dimensions unknown) were excavated within the depression of House 20, located in the extreme northwestern corner of the site; these trenches comprised XU-2 and were extended to cross the fortification ditch. Bowers reported "...a ramp such as was isolated and described for the Pott's site..." (1962: Report No.3, June 30). A fire pit was exposed two feet below the surface within the center of the house depression, wall posts were defined and a series of large posts were exposed adjacent to and outside the structure. Bowers suggested that the exterior posts were the remains of corn-drying scaffolds. The fortification ditch adjacent to House 20 proved to be "...more than 8 feet deep..." and "...almost entirely clean of rubbish" (Bowers 1962: Report No. 4, July 7). Detailed profiles were apparently completed for both ditch exposures. Specimen catalog entries indicate that a minimum of 28 posts and three pits were uncovered.

Excavation Unit 3 consisted of a single trench (? x ca. 50 feet) placed perpendicular to and across the middle ditch south of House 19 (Figure 2). No features are listed in the specimen catalog. Bowers noted "It was found that the ditch was not so deep, which confirms my earlier belief that both sections of the site must be treated as a single occupation" (1962: Report No. 4, July 7). The weekly field report also suggests that XU-3 intersected an adjacent house depression but no further details are provided and investigators were unable to find the depression during 1969. Both Bowers's 1930 map and the unauthored map show a small (ca. 35 feet diameter) depression just south of the ditch and House 19; it is likely that this feature is the one referenced by Bowers.

Three excavations (XU-4, 4A, 4B) were located adjacent to and within the western margin of the fortification ditch. At least two pits and 345 posts were recorded within this complex. Excavation Unit 4 consisted of three trenches which intersected to form a Y-shaped unit superimposed over the juncture of the middle and western ditch lines. The results of this excavation are unknown.

Excavation Unit 4A was a relatively large block which exposed what was initially believed to be "...a substantial superstructure in the nature of a platform...." Bowers's 1930 map shows a house depression in the general area but it is not identified in the 1962 field narrative. Subsequent work revealed considerable complexity and the precise nature of the features represented in this area was not fully resolved.

Simply stated, we are having problems there, real big problems. One day it seems that we are excavating a rectangular lodge and the artifacts and pottery seem consistent with what we should expect and then posts run off in some other direction and it looks like an entrance under a large superstructure of some sort. There is burnt wood everywhere and postholes by the hundreds. Our best opinion is that there is a lodge there - we have found walls and a fireplace in its proper place - but there must be much more. The artifacts at the surface are Choteau and at the bottom more Huff-like [Bowers 1962: Report No. 6, July 10].

Bowers later reported:

A complex defensive system and a series of long-rectangular houses was partly uncovered. Apparently there were at least two, and perhaps three, occupation periods represented, but time did not permit sufficient excavation to uncover the whole story. The earliest occupation of the Davis Site is several centuries earlier than that at the Red Horse Hawk Site [1963b:118].

A smaller block unit expanded from the eastern leg of the "Y," was designated XU-4B. Bowers reported that this unit exposed a walled entrance. "There was a raised earthen platform, strongly reinforced, and some evidence of a raised bastion" (1962: Report No. 5, July 13). The subsequent weekly narrative is even more definite:

The rightwing strong point was exposed showing a fortified entrance and post outline which was unburnt. In general, this area is largely completed and the picture there is rather clear [Bowers 1962: Report No. 6, July 20].

The unauthored map depicts a mound (ca. 60 x 40 feet) at the precise location of XU-4B. Both this map and Over's 1920 rendering show the ditch line turning eastward around the area of the mound before turning back to the south.

Two further excavations appear to have been initiated during the 1962 season. A trench (40 x 4 feet?) was started within the depression of House 14, though the unit is not mentioned in the field narrative and no materials are inventoried in the specimen catalog. The location and year of excavation are based on inspection of aerial photographs taken in 1962 and 1963. An excavation was also completed in an area of the site which showed no evidence of house depressions. Bowers noted: "Refuse was thin but...found a cache with pottery that does not seem to be characteristic of the surface of the site but more like that at Huff" (1962: Report No. 3, June 30). The location of this unit is unknown.

The 1962 season ended on the following note: "Investigations at this site have established that it is an exceedingly complex one that cannot be fully appraised on the basis of only a few weeks of testing" (Bowers 1962: Report No. 10, August 18).

1963 Season

The 1963 season at 39CO14 began in mid-June and continued on an intermittent basis until the end of August. Efforts appear to have been totally directed toward the exposure of house floors utilizing a tractor and 'frezno'. This

work involved XU-2 (House 20), trenched the previous season, and XUs-5, 6, 7 and 8.

Documentation for work on XU-2 is limited to photographs taken during the 1963 season (e.g., Falk and Ahler 1988:Plate 2b); no materials are listed in the specimen inventory. Work on XU-2 appears to have been abandoned some time during the summer. Limited attempts during 1969 to further clarify Bowers's work within this unit proved unsuccessful, in part because subsequent U.S. Army Corps of Engineers landscaping obliterated the excavation and much of the surrounding ditch.

Not much information is available concerning work within the four new structures. Houses 4 (XU-8), 6 (XU-6) and 17 (XU-5) were partially exposed but the excavations were not completed. House 5 (XU-7) was exposed and mapped; ten features and 192 posts were recorded. Specimen catalog entries also suggest that midden areas external to Houses 4 and 5, as well as the area between the two structures, were investigated. Some notion of the summer's progress can be gained from the weekly field narratives as shown in the following excerpts:

Monday and Tuesday the entire crew worked at the Davis site 39CO14 lifting lodge roofs and cutting a trench from the east bank to the lodge of excavation unit #6. Fireplaces have come out quite well but lodges at this site are not easy to outline due to the more perishable woods used and rather irregular post arrangement [Bowers 1963a: Report No.?, June 29].

At the Davis Site we are working with a tractor and frezno lifting the roof covers and everything is working out fine....Give us three more days and we should have six or seven lodges ready to clean up and map [Bowers 1963a: Report No. 5, July 26].

We kept the tractor and frezno running Monday through Wednesday lifting roof covers and everything worked out fine. Knowing the position and depth of the fireplaces and by testing periodically, we were able to shave within a few inches of the floor since the floors seem to be relatively clean of artifacts. We have 4 1/2 lodges cleared and are currently cleaning off the floors. Though rather large logs were used for uprights, there seem to be neither leaners nor willow covers and the burnt sections are a bright orange in color. There is a rich stone assemblage but bone is not so abundant as in later sites. Intralodge cache pits are not common....Three lodge floors are now nearly exposed with shovels so we are making good progress here [Bowers 1963a: Report No. 6, August 2].

After lifting the bulk of the roof covers of 4 1/2 lodges we found that it was impossible to trace out the floors and post arrangements due to the dryness and hardness of the fill. We began hauling water, 110 gallons per load, and wetting it down and the features are now coming out in fine order. Unfortunately taking one man off to haul water we are running behind schedule and will be terribly cramped for time to finish what we have laid out there. We are getting a good sample of artifacts from the site -- nothing spectacular -- and the lodges are turning out to be about 42 feet in diameter, roughly circular without leaners [Bowers 1963a: Report No. 7, August 9].

Work at this site this summer has been both fruitful and frustrating. After getting what we thought to be the bulk of the roof cover removed from 4 1/2 lodges, the ground was so dry that it was virtually impossible to follow floors or identify posts and we finally abandoned all of the lodges except one which we kept wetting. With the rains this

week the floor is coming out in fine shape and the posts and other features as well. This is proving to be a lodge in excess of 51 feet in diameter with some repair areas. Pothunters had destroyed a section of the entrance, otherwise we will have a good map [Bowers 1963a: Report No. 9, August 23].

Davis 39CO14 finally got its water. After hauling 2600 gallons from town and dousing one lodge we got two floods and filled our excavations so they overran. We could not get into the site until today and our efforts were directed to the one lodge we could probably finish this year. That will leave four units unfinished and in a state pothunters dream of but rarely find. We miscalculated the size of the lodges and the depth except at the centers and there is a good deal of work to be done on the other four units [Bowers 1963a: Report No. 10, August 30].

1964 Season

Bowers's final field season at 39CO14 was limited to a two-week effort during the latter half of August 1964. Work was continued at Houses 4 and 17 which had been exposed the previous year; both machine and manual excavation techniques were employed. House 4, labeled XU-8 in 1963, was designated XU-6 in 1964. Eleven features (pits?) and 277 postmolds were recorded for House 4. Four features (pits) and 241 postmolds were recorded for House 17 (XU-5).

Two narrative entries for the 1964 season warrant consideration:

We have made good use of machinery and this is particularly so at Davis 39CO14 where we cleared off most of the roof cover of two lodges and are moving right along clearing the floors and excavating out the postmolds. Other than the fireplace and these postmolds, we are not finding much on the floors and with perhaps 25% of the floors of the two lodges now cleared, we have not discovered any interior caches [Bowers 1964: Report No. 9, August 15].

A word about Davis: we have excavated two lodges during the last two weeks and what lodges they turned out to be! There is not a leaner in the lot like at Red Horse and no closely-clustered posts around the periphery. Still the two lodges had over 600 posts. They are very large and the one I measured off was in excess of 54 feet in diameter in one direction and the mapper says other axes are even greater. The interior caches are small and the exterior one huge. There are not many agricultural tools but the quantity of hunting tools is immense [Bowers 1964: Report No. 11, August 22].

Bowers's field investigation of 39CO14 concluded in 1964. A paper detailing the last year of work was presented at the 24th Plains Conference in 1966. A brief excerpt from the published abstract provides a summary of his findings:

The Davis site (39CO14) is a strongly fortified precontact site with an inner ditch and numerous lodges outside the fortifications. Most of the lodges were large, grass or mat-covered, and erected over a basin-like depression. Initially lodges were also placed at the corners of the fortifications. The village had been burned and rebuilt several times. Culturally, the site is closely related to Rygh, Bamble (lower horizon), Mobridge (lower horizon), and Swan Creek sites among others [Bowers 1967:204].

1969 Investigations

At the time of the 1969 investigations, the surface of the site was marked by a number of highly visible circular depressions and the remains of former excavations – all enclosed within a generally rectanguloid complex of fortification ditches (Figure 2). Most excavations were not back-filled. An old dirt road bordered the site along its western margin and a number of foot trails were evident within and outside the ditches. The area mapped in 1969 is defined by the encircling ditch which is exposed in the cutbank at the northern and southern corners of the site. The long axis of the enclosed area is roughly parallel to the original terrace margin. An additional ditch, generally parallel to the northern and southern perimeters, divides the site into two unequal parts. The southern unit is ca. 450 x 600 feet, or around 270,000 ft.² (6.2 acres); the northern unit is ca. 200 x 450 feet, or about 90,000 ft.² (2.1 acres). As discussed above, Over's 1920 map indicates that the ditch originally encircled the entire site, though maps produced in subsequent years suggest that the eastern edge of the site slumped, destroying evidence of the original ditch. By 1969 surface evidence of the northwestern corner of the ditch had also been destroyed by comparatively recent shelter belt cultivation and other landscaping activities.

A total of 20 probable houses sites, including those investigated by the Smithsonian in 1962-1964, were mapped in 1969; the recorded depressions varied in size from 35-70 feet in diameter. Seventeen of these are located in the southern unit and three are located north of the middle ditch in the northern unit (Figure 2). Over's 1920 map shows 26 presumed depressions within the southern unit and eight more in the northern unit, or "annex." Bowers's 1930 map shows 23 depressions; five of these are within the northern unit. The unauthored map also illustrates 23 depressions, but only three of these are located in the northern unit. Examination of an enlargement of a portion of the 1938 U.S. Department of Agriculture aerial photograph (Falk and Ahler 1988:Plate 1b) suggests that the depressions may have been somewhat more numerous than represented in the 1969 map. This same aerial photograph indicates that a number of depressions were probably located outside the ditch to the west and south, although none of the existing maps include such features (see, however, Bowers 1967:204). Road construction and landscaping, combined with a heavy vegetation cover, made surface identification of these features difficult, if not impossible, in 1969.

Examination of deposits exposed in the cutbank profile in 1969 resulted in the classification of soils as belonging to a broad family (Haplustolls) of coarse-silty, mixed soils characteristic of grasslands (Keil and Boden 1969). A variety of grasses were recorded in the immediate site area including both native (bluestem, green needlegrass, blue grama, sand dropseed) and introduced (crested wheatgrass, Kentucky bluegrass, smooth brome, Japanese broom) forms (Pozarnsky 1969). Vegetation within house depressions included barnyard grass, cheatgrass brome and snowberry ("buckbrush"). Additional trees and shrubs identified were box elder, wild plum, chokecherry, golden currant and wild grape; forbs included wild rose, skeleton weed, stinging nettle, blue lettuce, prairie and fringed sage, and goatsbeard.

The 1969 field investigation began on June 12 and continued through August 20. A detailed plan map was prepared documenting surface features, excavation units completed in 1969 and, in-so-far as possible, units resulting from the 1962-1964 Smithsonian investigation. One house structure was fully exposed and excavated and two others, previously investigated by Bowers, were examined (Table 30). Ten additional tests were completed; three of these provided cross sections of the perimeter ditches, while the remaining seven provided controlled samples from a variety of site contexts. Approximately 5335 ft.² (about 1.5 percent of the total site area within the fortified area) were exposed during the 1969 season.

Table 30. Summary of Excavation Units, Lower Grand Site (39C014), 1969 Season.

EXCAVATION UNIT	1962-1964 EQUIVALENT	EXCAVATED AREA (ft. ²)	SAMPLE DESCRIPTION
House Units			
House 6	XU-6 (1963)	750	Partial house floor with associated features; exterior midden, features
House 12	-	4150	House roof, floor, associated features; exterior midden, associated features
House 17	XU-5 (1963-1964)	2300	Floor of RBS excavation exposed to map architectural detail; unexcavated features exposed
Test Excavations			
1	-	215	Midden sample
2	-	45	Midden sample
3	-	25	Midden sample
4	-	25	Midden sample
5	-	25	Midden sample
6	-	50	Midden sample
7	-	25	Midden, exterior pit sample
8	-	25	Midden, exterior pit sample
9	-	-	Vertical ditch profile
10	-	135	Vertical ditch profile; pit sample
11	-	-	Vertical ditch profile
Total Area (1969) ^a		5335	

a: Total does not include backfill removed from House 17 or midden removed above Test 10 profile unit.

House 12

House 12 is an architectural feature marked by a circular arrangement of posts ca. 61 feet in diameter (Figure 13). Each of these posts was oriented more-or-less vertically and assumed to mark the outer wall of the structure. A regular pattern is definable for the outer ring of posts, consisting of a number of smaller posts (ca. 0.4-0.6 feet in diameter) set every 1.0-1.5 feet, interrupted at approximately 12-foot intervals by larger posts set in prepared holes a foot in diameter and more than two feet deep. A second, more irregular row of posts is definable ca. 6-7 feet inside the

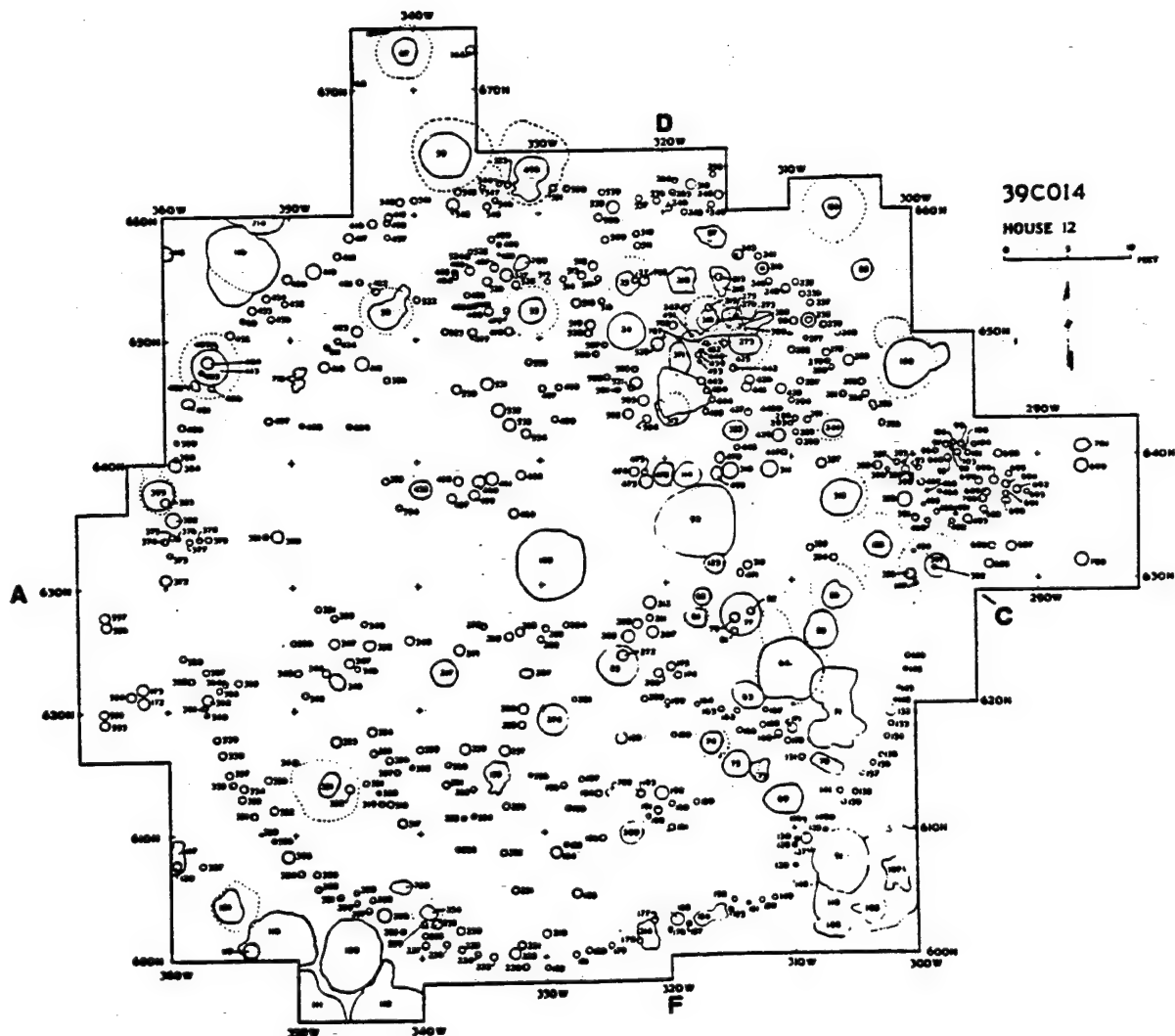


Figure 13. Plan of House 12, Lower Grand Site, 1969 investigations (from Falk and Ahler 1988:Figure 3).

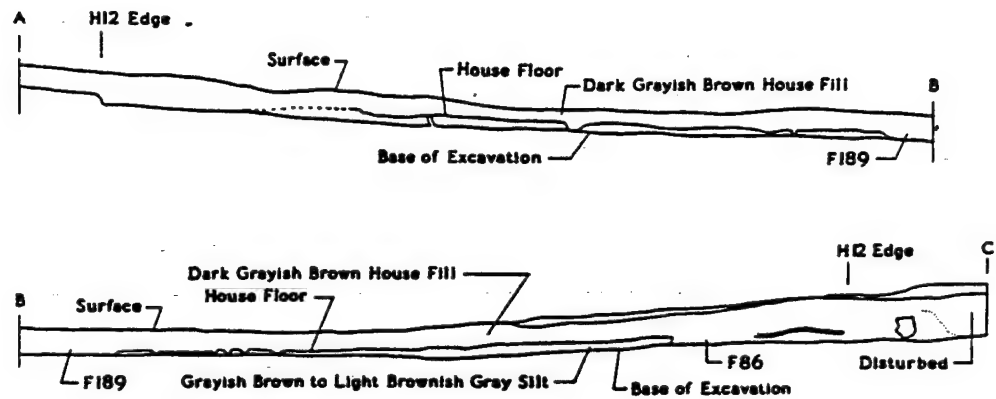
outer perimeter; this pattern is most easily seen in the western and southern portions of the house where pit density is less.

A basin-shaped depression (Feature 189), containing remnants of burned earth and ash, was found in the geometric center of the house. This feature is assumed to be the central hearth. The small quantities of ash and burned debris recovered from this feature suggest that it may have been cleaned of its contents immediately prior to the abandonment of the house.

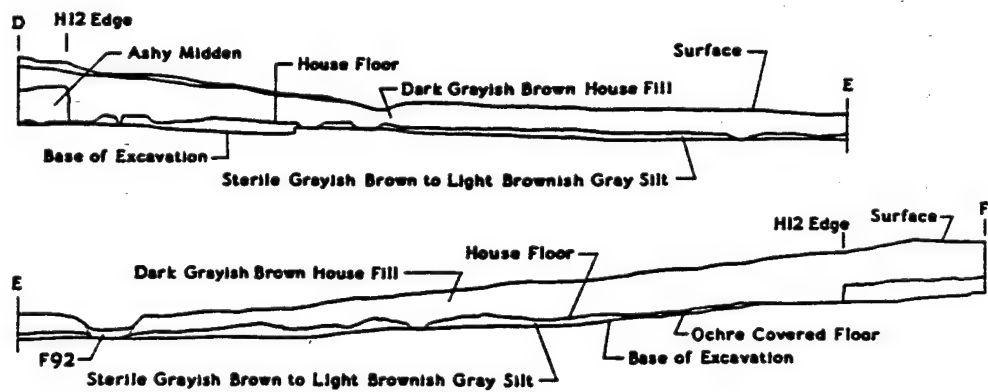
In circular houses of this general form it would be predictable to find four central roof supports arranged in a regular geometric pattern around the central hearth (Lehmer 1971:115). In House 12 this is not the case, but four post clusters can be identified, with each cluster centering around one or more larger posts. Locations for major support posts appear to be represented by Features 61, 62, 217, 438 and 476 (Figure 13).

Oriented in line with the longer sides of this cluster arrangement are three large posts holes (Features 699-701) located 14 feet outside the house wall. These posts appear to mark the end of an entrance passage extending to the east. Numerous subsurface and subfloor pits were found both within and outside of the limits of the house (Figure 13). During excavation, a clear distinction could rarely be made between the uppermost matrix, assumed to be derived in part from the collapse of the earth-covered (?) roof, and the debris containing floor zone, or between either of these layers and the undisturbed deposits beneath the house floor. In most cases there was only a gradual gradation from the uppermost dark grayish-brown silt which lay above the floor to the light brownish-gray silt that lay below the house floor (Figure 14). Exceptions to this pattern were found in isolated areas in the eastern and northern parts of the house, near the outer walls and inside the inner ring of posts. In these areas, a distinct band of burned earth or water laid, varve-like laminations marked the house floor and was easily recorded during excavation. Thin deposits of red ochre-like pigment were also recorded between the two rings of posts, generally north of the 650N grid line. In general there was little cultural debris on the floor of the house, particularly in the central area, and it appeared that the floor was regularly swept clean of all refuse and cultural material.

Profile records indicate that the structure may have been erected over a shallow (0.5 feet), prepared depression. Remnants of the depression could be seen on the northern and western perimeters of the house (Figure 14). In other areas (e.g., southern perimeter), a thick layer of midden appeared to have been piled against the outside wall of the house, with the original house floor placed on about the same level as the pre-midden surface outside the house. The house floor is dish-shaped, with the central hearth lying about 1.5 feet below the floor level at the outer wall. This dish configuration is probably the result of a number of factors: original excavation of the house floor, the possible impact of heavier foot traffic in the central floor area around the central hearth, and the cumulative effect of repeated sweeping and cleaning of the floor. The latter seems a likely factor considering the lack of cultural debris encountered in the central area of the house, and the large quantities of ashy hearth debris and small broken tool fragments



A-C North Profile - 630 N Line



D-F East Profile - 320 W Line

39C014

House 12 Profiles

0 2 4 6 8 10 Feet

Figure 14. Profile drawings for House 12, Lower Grand Site, 1969 investigations (from Falk and Ahler 1988:Figure 4).

concentrated in exterior house pits (e.g., Feature 102) where such debris may have been discarded. On the basis of data from House 12, it might be suggested that the interior hearth area was functionally distinct from the peripheral zones of the house, being subjected to more intense and frequent cleaning.

There is minimal evidence to indicate human use of this space prior to the construction and following the abandonment of House 12. Two pre-house pits (Features 393 and 413; Figure 13) were intruded into by the peripheral wall posts on the west and northwest sides of the house. Two extraordinarily large undercut pits located in the interior of the house (Features 64 and 92) were found to be unusual in that they were not filled with refuse upon abandonment of the site. Rather, they were left open and only partly filled; subsequently the undercut neck of each pit collapsed into the feature and the pit was filled with sediments similar in color and content to those forming the upper 0.5 feet of the house overburden. The unusual size, location and filling sequence suggests that these features may have been excavated in the house depression after the abandonment and collapse of House 12, and therefore, may post-date the period represented by house use.

In any event, there is no evidence for a violent or sudden abandonment of House 12. With the two exceptions noted here, all pits were filled with refuse and there is no evidence that the house burned. Stratigraphic information indicated that several of the larger interior roof support posts were intentionally removed for use elsewhere, while nearly all peripheral support and wall posts rotted in place.

House 6 (Figure 15)

While only a portion of this structure was excavated during 1969, a general picture of the architectural plan can be seen in the plotted features (Figure 15). It is assumed that the large, basin-shaped and ash-filled pit (Feature 620) is the central hearth and, further, that it marks the geometric center of the house. All the evidence, from Bowers's previous work and that conducted in 1969, indicates that the floor plan was circular. Assuming that the southern limit of the large concentration of postmolds in the excavated area marks the outer limit of the house wall (just south of the 460N line; Figure 15), the structure can be estimated to have been approximately 45 feet in diameter with an estimated floor area of ca. 1590 ft.² The 1969 excavation exposed ca. 550 ft.², or about one-third of this total.

A central support arrangement was not clearly defined. Several postholes located within a ten foot radius of the house center (e.g., Features 585, 593, 595, 596, 600, 648-651, and 675) are relatively deep (1.5-2.4 feet), have rounded to flat bottoms, and may have served as sockets for major support timbers.

The scattered arrangement of the peripheral support or wall posts is also rather confusing and stands in marked contrast to the orderly, systematic arrangement of peripheral posts recorded for House 12 (Figure 13). The large number of excavated postholes, and the fact that many were filled with bone, ceramic and other cultural debris, may suggest repair and rebuilding activities during the life of the structure. No evidence was found for the entryway. Given the eastern entrance orientations recorded for Houses 12 and 17 (see below), it seems likely that this portion of House 6 had been lost to the reservoir prior to 1969.

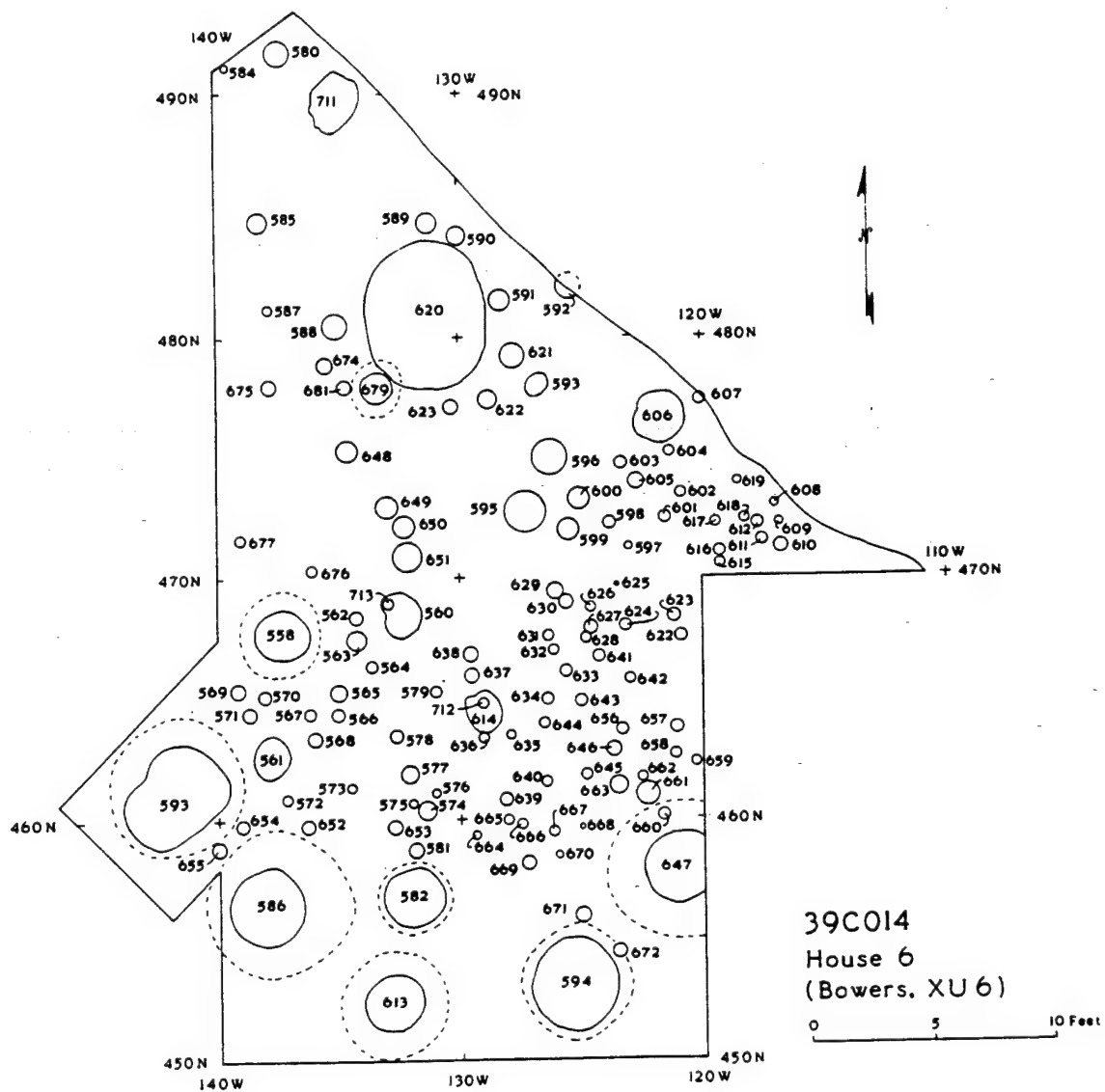


Figure 15. Plan map of the excavated portion of House 6, Lower Grand Site, 1969 investigations (from Falk and Ahler 1988:Figure 5).

Eight additional features were found within the House 6 wall line. These include two undercut pits (Features 588 and 679), three basin pits (Features 560, 561 and 620) and one cylindrical, flat-bottomed pit (Feature 614). Two areas of reddened, baked earth (Features 606 and 711), indicating the location of surface fires, were also recorded on the house floor; a third area of fired earth (not assigned a feature number here) was found in the northeastern edge of the excavation unit, between Features 616 and 618 (Figure 15).

Six medium-sized to large undercut pits (Features 582, 583, 586, 594, 613 and 647) were found outside and to the south of the presumed wall. Two of these, Features 586 and 613, were lined with a grass-like material.

There is no indication that the house was placed in a pre-excavated depression of any sort. A deep midden was found adjacent to the exterior wall of the house and the house floor lies on the same level as the pre-midden exterior surface. Small quantities of charcoal were found in the midden and in the fill of many features; no evidence (e.g., burned posts or other structural materials) was found to indicate that House 6 burned prior to its abandonment.

House 17 (Figure 16)

Figure 16 illustrates House 17 features as exposed by skimming; numbered features indicate pits and postholes which were not excavated in 1964 but were exposed and subsequently excavated in 1969. Materials from four undercut pits and 28 postmolds were salvaged. The floor plan of House 17 is similar in many respects to that inferred for House 6. The floor plan is elliptical, measuring ca. 46 feet (east-west) x 50 feet (north-south). The estimated surface area is ca. 1809 ft.² A four-center-post pattern is identifiable, with both paired and single posts recorded. The apparent periphery of the house is marked by an unpatterned concentration of postmolds with generally smaller diameters. An entryway, marked by two parallel rows of posts, is located on the eastern side of the house. All of the undercut pits recorded in 1969 were found at (Features 17 and 22) or just outside (Features 21 and 56) the presumed wall line.

Tests 1-8

Test 1 revealed little evidence of structures other than a few posts. A large basin-shaped depression was partially exposed in the eastern end of the trench. The irregularity of the outline and floor of this feature indicates that it may represent a refuse-filled borrow pit. Other features in Test 1 include an undercut pit, a basin pit, a cylindrical pit, and a surface concentration of ceramic debris. **Inspection of the full bank line during 1969 revealed a number of similar pits, apparently not associated with any particular structure. Most pits visible in the bank were vandalized.**

Tests 2-6 were intentionally placed in extramural midden deposits, and thus revealed little architectural evidence and few features. No features were identified in the excavation of Test 2, although a postmold was identified in the west wall profile. Given the proximity of Test 2 to House 19 and its location on the eastern side of the house, it is possible that this postmold is part of the house entrance. The sloping character of midden deposits evident in Test 2 - West Profile may have

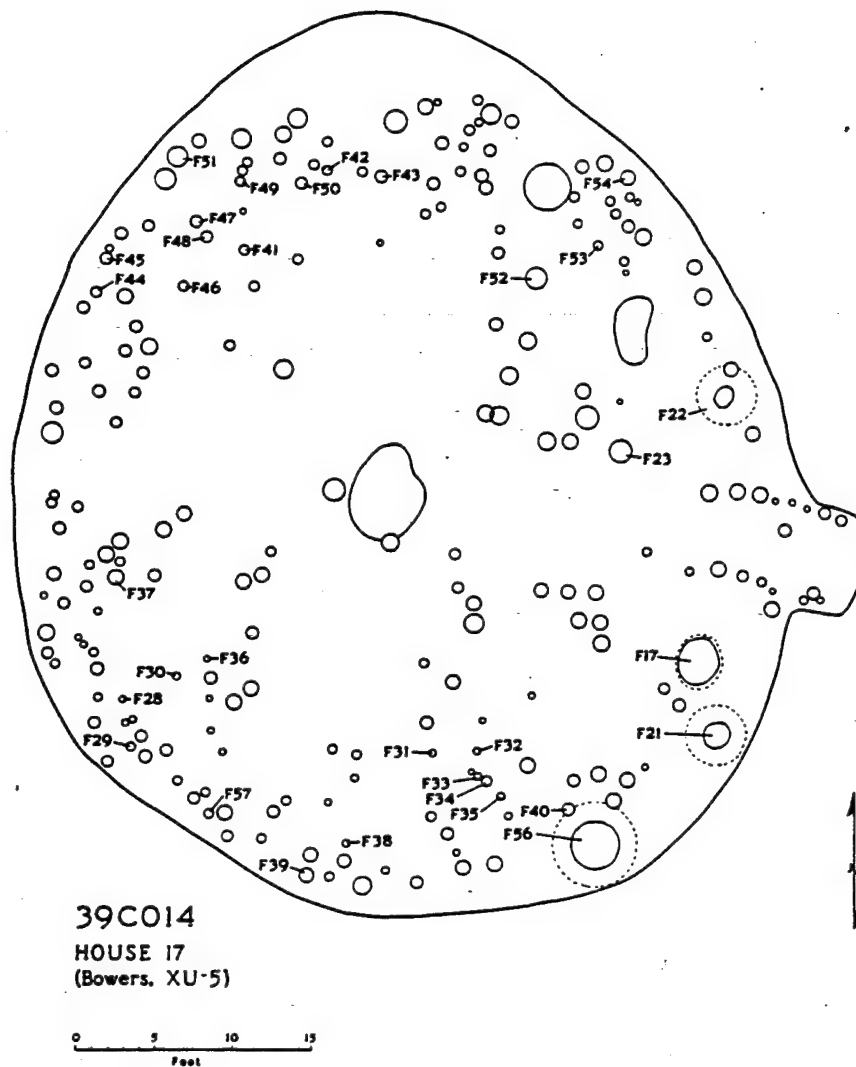


Figure 16. Plan map of House 17, Lower Grand Site, 1969 investigations (from Falk and Ahler 1988:Figure 6).

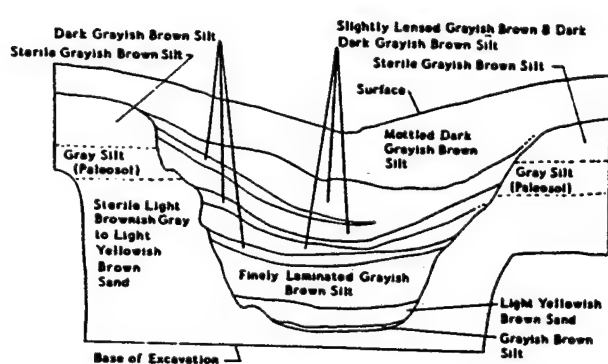
resulted from soil placed against, or washed down from, the house. Cultural debris in Test 3 was concentrated from ca. 0.4-1.5 feet below datum (s.d.) A postmold and an area of fired earth were recorded in the floor of this excavation unit. Test 4, located to the north of House 2, was excavated to a depth of 2.5 feet. The corner of a large basin pit was exposed in the northeast quarter of the test at a depth of ca. 1.5 feet s.d. Test 6, located along the inside margin of the north perimeter ditch, exposed three postmolds possibly associated with a palisade, or fence line, set just inside the ditch. A thin layer of charcoal and burned cultural debris was found in the northern part of the test, between the presumed palisade and the edge of the ditch.

Tests 7 and 8 exposed large undercut pits and, together with Tests 2 and 6, provided a sample of material from the area north of the middle ditch.

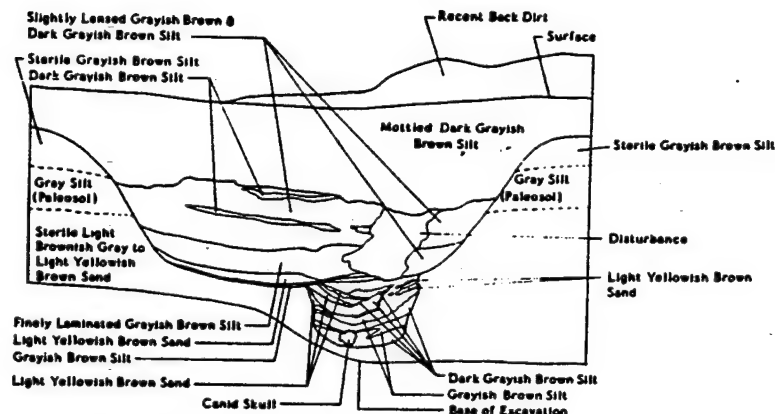
Tests 9-11

Tests 9-11 revealed cross sections and stratigraphic evidence relating to the fortification ditches and their possible sequence of construction (Figure 17). Test 11, located at the southern end of the site, revealed a broad, flat-bottomed ditch superimposed over, or excavated into, an earlier ditch with a deeper, more V-shaped profile. The profile in Test 9, exposing the north perimeter ditch at its most northeastern point, revealed a cross section most similar to the more recent flat-bottomed ditch in Test 11. The middle ditch exposure, Test 10, showed a distinct, deep V-shaped profile, strongly resembling the earliest ditch in Test 11. From these observations, it may be hypothesized that the original fortification ditch around the site was deep, narrow and V-shaped and followed the outline of the smaller southernmost rectangle. This outline is clearly evident both in the enlarged section of the 1938 aerial photograph (Falk and Ahler 1988:Plate 2b) and in the 1969 plan map of the site (Figure 2). After a period of natural filling, the ditch was re-excavated and broadened on the southern, western and, perhaps, eastern sides. The ditch appears to have been extended to the northwest, perhaps to enclose House 20 and back to the east to enclose the area lying north of Houses 19 and 21. This reconstruction contradicts views held by Over, as well as Bowers, who felt that the sequence was just the reverse -- an early encircling perimeter ditch followed by a contraction of the site area marked by excavation of the middle ditch (Bowers, personal communication [to Falk and Ahler], 27th Plains Conference, November 1969). When field records, profiles and maps for the 1962-1964 investigation are made available (especially those for XUs 2-4) further light may be shed on this matter.

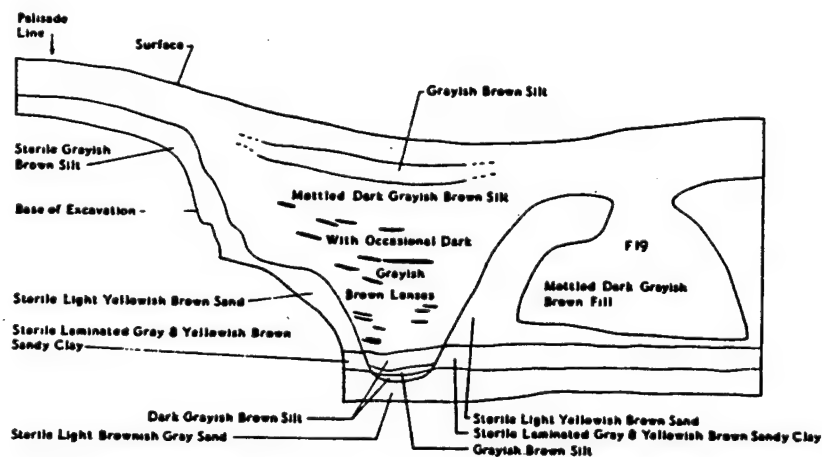
In the process of completing the profile for the middle ditch (Test 10), several features were exposed which require consideration. The orifice of a large undercut pit, Feature 19, was exposed just to the north of the ditch center line. A second undercut pit, Feature 20, was discovered in the floor of Feature 19; the floor of this second pit was approximately 8.0 feet below the sloping surface of the ditch. Both pits were markedly devoid of artifactual debris. Stratigraphic and chronological relationships between the two-pit complex and the ditch were not adequately defined. Feature 18 (Burial 1), the disarticulated remains of a human infant, aged 0-6 months (Smith 1972), was found 1.6 ft. below the orifice of Feature 19. Finally,



TEST 9 - WEST PROFILE OF NORTH DITCH



TEST 11 - SOUTHWEST PROFILE OF SOUTH DITCH



TEST 10 - WEST PROFILE OF MIDDLE DITCH AND FEATURE 19

39C014
Ditch Profiles

0 1 2 3 4 5 Feet

Figure 17. Profile drawings for test excavations 9-11, Lower Grand Site, 1969 investigations (from Falk and Ahler 1988:Figure 9).

two postmolds, possibly representing a portion of a palisade line, were found ca. 10 feet south of the ditch center line.

Table 31 provides a summary of previous studies of the assemblages from 39CO14 completed by 1988.

Table 31. Summary of Completed Analyses, Manuscripts, Conference Papers, and Tabular Information Presented in Falk and Ahler (1988) for the Lower Grand Site (1962-1964, 1969) Assemblages.

CATEGORY	IN FALK AND AHLER 1988	OTHER REFERENCES
Chipped stone tools	Appendix F, Table F.1	Ahler 1975a-b, d; 1976b, 1979, 1983
Chipped stone flaking debris		Ahler 1975c; 1976a-b; 1977
Ground stone tools	Appendix F, Table F.1	
Fire-cracked rock		Ahler 1976a
Ceramics	Appendix B	Ehrenhard 1973
Modified bone, antler	Appendix F, Table F.2	Falk 1986
Unmodified vertebrate remains	Appendix F, Table F.3	Falk 1977a, 1986; Morey 1984, 1986; Peterson 1980; Semken 1976, 1983; Semken and Falk 1980, 1987; Semken and Foley 1979
Freshwater mussels		Warren 1972, 1973
Botanical remains	Appendix C	Nickel 1974, 1977; Weakley 1971
Pollen		Ahler et. al. 1974; Vehik 1971
Radiocarbon	Table 9	Ahler 1975a; Tucek 1977
Obsidian hydration		Davis 1972
Human remains		Smith 1972
Natural rock		Ahler 1976a
Soils, geomorphology		Keil and Boden 1969

THE LOWER GRAND SITE AND THE EXTENDED COALESCENT TRADITION

by Peter Winham

Falk and Ahler (1988) summarize a number of aspects of the Lower Grand site and compare these patterns to other Extended Coalescent sites.

Settlement and Community Patterns

The village pattern at Lower Grand shows some broad similarities with that described for the Extended Coalescent No Heart Creek, Moreau River (Johnston and Hoffman 1966), Molstad (Hoffman 1967), Potts (Stephenson 1971) and Hosterman (Miller 1964) sites. Similarities include a fortified enclosure associated with a number of structures located outside the fortified area. A number of potentially important differences may be cited however: the fortified enclosure at Lower Grand is larger and more rectangular than circular; Lower Grand appears to lack the well-defined bastions found at Potts, Molstad, Moreau River; and – based on available site maps and aerial photographs – house densities within fortified areas are probably somewhat higher for each of these sites than suggested for Lower Grand [Falk and Ahler 1988:60].

Architecture

Structures at the Lower Grand site are more or less circular. No long rectangular structures were identified, although Bowers (1963b) reported rectangular houses following the 1962 field season at Lower Grand. A summary of architectural characteristics is presented in Table 32 (after Falk and Ahler 1988:Table 8).

Table 32. Architectural Characteristics for Structures Excavated at the Lower Grand Site (1962-1964, 1969).

HOUSE NUMBER	GENERAL FORM	DIAMETER (FEET)	ESTIMATED FLOOR AREA (FT ²)	FLOOR LEVEL	ORIENTATION OF ENTRANCE
4	circular?				
5	circular?	51.0	2043		
6	circular?	45.0	1590	Surface	
11	circular?				
12	circular	61.0	2922	Subsurface	E
14	?				
17	elliptical	48.0	1809		E
20	circular?				

The excavated houses also show considerable variation with respect to the arrangement of perimeter support posts, as well as in the number and arrangement of central supports.

The meaning and cultural-historical significance of architectural details recorded at Lower Grand is unclear, at least in terms of patterns documented for archeological components in the Grand-Moreau region. In reviewing evidence for Extended Coalescent house form and construction, Lehmer (1971:115) notes considerable variation in size, shape, and arrangement of supporting posts. A review of reported house plans for Extended Coalescent sites in the general region (e.g., Wilmeth 1958, Miller 1964, Woolworth and Wood 1964, Hoffman 1967, Stephenson 1971) substantiates this observation. Certain basic similarities are evident, including the irregular to circular outline and some variation of the four-post central support pattern. Structures at Payne, Molstad, Hosterman and Demery were erected within excavated pits while those at Potts appear to have been built on a flat surface. Recorded wall post patterns vary from absent (Demery) to irregular (Payne, Molstad, Potts) to patterned arrangements similar to those described for House 12 at Lower Grand (Hosterman, Feature 22), and House 19 at Walth Bay (Potts, Lodge 6). One is left with the conclusion that an on-site visit to any one of these villages during the 1500-1600s would have revealed as much architectural diversity as might be expected in many historic communities [Falk and Ahler 1988:63-64].

Radiocarbon Analysis

Table 33 (after Falk and Ahler 1988:Table 9) summarizes provenience information, sample composition and uncorrected results for radiocarbon dates obtained prior to 1994. Using procedures described by Long and Rippeteau (1974) and Damon et al. (1974), Ahler averaged each series, tested for inclusion of biased dates and converted the results to true calendrical age. The true age for Lower Grand was determined to be A.D. 1354 \pm 133 yr B.P. This date for Lower Grand is especially surprising given Lehmer's assignment of the site to the late end of the Extended Coalescent sequence (Lehmer 1971:116, 127).

Table 33. Radiocarbon Age Determinations for the Lower Grand Site (39CO14) from Samples Submitted Prior to 1994.

SAMPLE NUMBER	CATALOG NUMBER	PROVENIENCE	SAMPLE I.D.	RADIOCARBON YEARS B.P.	CALIBRATED AGES TO 1 SIGMA (A.D.)
RL-300	1068	House 12, F-102, Level 7 (E ¹ / ₂) (undercut pit)	Wood charcoal (8 gm); <i>Salix/Populus</i> spp.	590 \pm 90	1297-1431
RL-301	1706	House 12, F-401, (wall post)	Wood, unburned (3 gm); unidentified	650 \pm 120	1277-1416
RL-302	1983	House 6, F-582, Level 3 (undercut pit)	Wood charcoal (10 gm); <i>Salix/Populus</i> spp.	490 \pm 90	1400-1473
RL-303	2169	Test Excavation 6, Level 6	Wood charcoal (9 gm); <i>Salix/Populus</i> spp.	600 \pm 90	1295-1426

These dates can be compared to those obtained in 1994 under the current contract:

Sample 85-2-72

Radiocarbon Age

Calibrated age

one sigma

two sigma

B.P. 510 \pm 90

cal A.D. 1426

cal A.D. 1398-1449

cal A.D. 1300-1516 1591-1621

Sample 85-2-41

Radiocarbon Age

Calibrated age

one sigma

two sigma

B.P. 270 \pm 80

cal A.D. 1651

cal A.D. 1516-1591 1621-1675

1776-1798 1943-1954

cal A.D. 1448-1822 1833-1882

1912-1954

Conclusions

The 1984 excavations at the Lower Grand site were of a salvage nature. The information available to prepare this report was limited and there remain some uncertainties about the provenience of a number of the artifacts. Nevertheless, taken as a whole, the analyses of this assemblage have addressed a number of issues, such as the chronological positioning of the site and comparisons between cache pit assemblages, that contribute to our understanding of the Extended Coalescent variant in the Grand-Moreau region.

REFERENCES CITED

Ahler, Stanley A.

- 1971 *Projectile Point Form and Function at Rodgers Shelter, Missouri*. In Missouri Archaeological Society Research Series, No. 8, edited by W. Raymond Wood. University of Missouri-Columbia and Missouri Archaeological Society.
- 1975a *Pattern and Variety in Extended Coalescent Lithic Technology*. Ph.D. dissertation, Department of Anthropology, University of Missouri, Columbia. University Microfilms, Ann Arbor, Michigan.
- 1975b *Extended Coalescent Lithic Technology: Supporting Data, Parts I-III*. Ms. on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- 1975c *Report to the Midwest Archeological Center on a Field Trip in Western South Dakota and North Dakota for the Purpose of Locating and Sampling Prehistoric Lithic Source Materials*. Submitted to National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- 1975d *Arrow Points, Hide Scrapers, and Sex-Based Bias in Stylistic Analysis. Abstracts of the 33rd Plains Conference:3*. Lincoln, Nebraska.
- 1976a *Quantification and Computer Coding of Data on Fire-Cracked Rock, Chipped Stone Flaking Debris and Natural Rock Debris from Walth Bay, Helb, and Lower Grand Archeological Sites, South Dakota*. Submitted to National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- 1976b *Lithic Resource Utilization Patterns in the Middle Missouri Subarea. Abstracts of the 34th Plains Conference:11*. Minneapolis.
- 1977 *Lithic Resource Utilization Patterns in the Middle Missouri Subarea*. In Trends in Middle Missouri Prehistory: A Festschrift Honoring the Contributions of Donald J. Lehmer, edited by W. R. Wood. *Plains Anthropologist Memoir* 13:22(78), Part 2:132-150.
- 1979 *Functional Analysis of Nonobsidian Chipped Stone Artifacts: Terms, Variables, and Quantifications*. In *Lithic Use Wear Analysis*, edited by B. Hayden, pp. 301-328. Academic Press, New York.
- 1983 *Use-phase Classification and Manufacturing Technology in Plains Village Arrowpoints*. Paper presented at the 48th Annual Meeting of the Society for American Archaeology, Pittsburgh.

Ahler, Stanley A., D. K. Davies, C. R. Falk, and D. B. Madsen

- 1974 *Holocene Stratigraphy and Archeology in the Middle Missouri River Trench, South Dakota*. *Science* 184:905-908.

Ahler, Stanley A., and Anthony A. Swenson

- 1985 *A Manual for Describing and Coding Ceramic Vessels from the Knife-Heart Region of the Middle Missouri Subarea, North Dakota*. Contribution No. 227. Department of Anthropology, University of North Dakota, Grand Forks. Submitted to National Park Service, Midwest Archeological Center, Lincoln, Nebraska. Contract Nos. CX-6000-6-AO61 and CX-6000-1-0045.

- Baerreis, D. A., and J. E. Dallman
 1961 *Archaeological Investigations Near Mobridge, South Dakota*. Archives of Archaeology No. 14. University of Wisconsin, Madison.
- Berg, Richard E.
 1991 Archeological Test Excavation Adjacent to the Davis Site, 39CO14, in Corson County, South Dakota. In-house report, U.S. Army Corps of Engineers, Omaha District, Omaha, Nebraska.
- Bowers, A. W.
 1948 *A History of the Mandan and Hidatsa*. Unpublished Ph.D. dissertation, Department of Anthropology, University of Chicago.
 1950 *Mandan Social and Ceremonial Organization*. University of Chicago Press, Chicago.
 1962 Party No. 11 - Oak Creek/Grand River. In *1962 Missouri Basin Project Weekly Reports*, Report Nos. 1-8, June 24-September 7, 1962. Smithsonian Institution, River Basin Surveys, Lincoln, Nebraska.
 1963a Party No. 12 - Davis Creek Site. In *1963 Missouri Basin Project Weekly Reports*, Report Nos. 1-10, June 14-August 30, 1963. Smithsonian Institution, River Basin Surveys, Lincoln, Nebraska.
 1963b Investigations in the Mobridge Area, South Dakota. *Plains Anthropologist* 8(20):118.
 1964 Party No. 8 - Mobridge Party. In *1964 Missouri Basin Project Weekly Reports*, Report Nos. 1-10, June 20-August 22, 1964. Smithsonian Institution, River Basin Surveys, Lincoln, Nebraska.
 1967 Field Report: 1964 Excavations of the Davis and Larson Sites, near Mobridge, South Dakota. *Plains Anthropologist* 12(36):204-205.
- Chomko, Steven A.
 1976 Faunal Exploitation in the Initial Middle Missouri Variant. In *Fay Tolton and the Initial Middle Missouri Variant*, edited by W. Raymond Wood, pp. 35-41. Missouri Archaeological Society Research Series No. 13. Columbia, Missouri.
- Cooper, Paul L.
 1953 Appraisal of the Archaeological Resources of the Oahe Reservoir, North and South Dakota. Missouri Basin Project, Smithsonian Institution. Ms. on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Damon, P. E., C. W. Ferguson, A. Long, and E. I. Wallick
 1974 Dendrochronologic Calibration of the Radiocarbon Time Scale. *American Antiquity* 39(2):350-366.
- Davis, L. B.
 1972 Letter report dated February 15, 1972. Site Files: 39WW203, 39CO14.
- Ehrenhard, J. E.
 1973 Preliminary description of ceramics from site 39CO14: 1962-1964 collections. Site Files: 39CO14.

- Evans, Howard E., and Alexander de Lahunta
1980 Miller's Guide to the Dissection of the Dog. W. B. Saunders Company, Philadelphia.
- Falk, Carl R.
1977a Analyses of Unmodified Vertebrate Fauna from Sites in the Middle Missouri Subarea: A Review. In *Trends in Middle Missouri Prehistory: A Festschrift Honoring the Contribution of Donald J. Lehmer*, edited by W. Raymond Wood. *Plains Anthropologist Memoir* 13:22(78), Part 2:151-161.
- 1977b Unmodified Vertebrate Remains from 39CO6. In *Archeological Reconnaissance and Test Excavation at the Jake White Bull Site, 39CO6, Oahe Reservoir, South Dakota*, by S. A. Ahler, pp. 169-219. Submitted to U.S. Army Corps of Engineers, Omaha District. Purchase Order No. DACW45-76-M-3883.
- 1986 Variability in Exploitation of Vertebrate Resources During the Late Prehistoric Period in North Central South Dakota. Ms. in possession of the author.
- Falk, Carl R., and Stanley A. Ahler
1988 *Archeological Investigations in the Mobridge Area, South Dakota, 1969-1970: Lower Grand (Davis), 39CO14; Walth Bay, 39WW203; and Helb, 39CA208*. American Archaeology Division, Department of Anthropology, University of Missouri, Columbia. Submitted to National Park Service, Rocky Mountain Region, Denver. Contract Nos. C3452(69) and C3501(69).
- Falk, Carl R., C. Angus, and A. Matsui
1984 Unmodified Bone and Antler. In *South Cannonball (32SI19): An Extended Middle Missouri Village in Southern North Dakota*, by D. E. Griffin, pp. 265-340. Submitted to National Park Service, Rocky Mountain Region, Denver.
- Falk, Carl R., C. Angus, and D. Morey
1980 Large Mammal and Other Vertebrate Remains. In *The Archeology of the White Buffalo Robe Site*, edited by C. Lee, pp. 526-617. Contribution No. 122. Department of Anthropology and Archaeology, University of North Dakota, Grand Forks.
- Gilbert, B. M.
1969 Some Aspects of Diet And Butchering Techniques Among Prehistoric Indians in South Dakota. *Plains Anthropologist* 14(46):277-294.
- 1990 *Mammalian Osteology*. Missouri Archaeological Society, Columbia, Missouri (2nd printing).
- Gilbert, B. Miles, Larry D. Martin, and Howard G. Savage
1985 *Avian Osteology*. B. Miles Gilbert, Flagstaff, Arizona. (2nd printing.)
- Haberman, T. W.
1982 The Travis I Site: Project Introduction, Historical Outline, Previous Records, and Modern Setting. In *Archeological Investigations at the Travis I Site, 39CO213, Corson County, South Dakota*, edited by T. W. Haberman, pp. 1-48. Contract Investigations Series 37. South Dakota Archaeological Research Center, Ft. Meade.
- Hoffman, J. J.
1967 *Molstad Village*. Smithsonian Institution, River Basin Surveys Publications in Salvage Archeology No. 4. Lincoln, Nebraska.

- Hurt, W. R., Jr.
1957 *Report of the Investigations of the Swan Creek Site, 39WW7, Walworth County, South Dakota, 1954-1956.* Archaeological Studies Circular No. 7. South Dakota Archaeological Commission, Pierre.
- Johnson, Craig M.
1977 *Stylistic Variation in Ceramics from the Medicine Crow Site (39BF2), South Dakota.* Unpublished M.A. thesis, Department of Anthropology, University of Nebraska, Lincoln.
1988 A Preliminary Description of Ceramic Remains from Sites 39CO14 and 39WW203. In *Archeological Investigations in the Mobridge Area, South Dakota, 1969-1970: Lower Grand (Davis), 39CO14; Walth Bay, 39WW203; and Helb, 39CA208*, by Carl R. Falk and Stanley A. Ahler, Appendix B. American Archaeology Division, Department of Anthropology, University of Missouri, Columbia. Submitted to National Park Service, Rocky Mountain Region, Denver. Contract Nos. C3452(69) and C3501(69).
1994 *A Chronology of Middle Missouri Plains Village Sites.* Draft report submitted to the Department of Anthropology, National Museum of Natural History, Smithsonian Institution, Washington, D.C.
1995 Letter to Peter Winham, dated January 7, 1995, discussing Johnson's rim ware assignments from the Lower Grand site. On file, Archeology Laboratory, Augustana College, Sioux Falls, South Dakota.
- Johnston, R. B., and J. J. Hoffman
1966 An Analysis of Four Survey Collections from Armstrong County, South Dakota, 39AR2 (No Heart Creek Site), 39AR4, 39AR5 and 39AR7. *Plains Anthropologist* 11(31):39-75.
- Keil, K., and P. Boden
1969 Soil classification and description, Lower Grand site area, June 24, 1969. Site Files: 39CO14.
- Lee, Chung Ho, and Steven K. Lovick
1979 Laboratory Investigations of White Buffalo Robe Village (32MN7), North Dakota. Paper presented at the 37th Annual Plains Conference, Kansas City, Missouri.
- Lehmer, D. J.
1971 *Introduction to Middle Missouri Archeology.* Anthropological Papers 1. National Park Service, Washington, D.C.
- Lehmer, D. J., and W. W. Caldwell
1966 Horizon and Tradition in the Northern Plains. *American Antiquity* 31(4):511-516.
- Long, A., and B. Rippeteau
1974 Testing Contemporaneity and Averaging Radiocarbon Dates. *American Antiquity* 39(2):205-215.
- Miller, Carl F.
1964 *Archeological Investigations at the Hosterman Site (39PO7), Oahe Reservoir Area, Potter County, South Dakota, 1956.* Smithsonian Institution, Bureau of American Ethnology Bulletin 189. River Basin Surveys Papers 35. Washington, D.C.

- Morey, D. F.
 1984 Notes on the catfish spines from sites 39WW203 and 39CO14. Site Files:39WW203, 39CO14.
- 1986 Studies on Amerindian Dogs: Taxonomic Analysis of Canid Crania from the Northern Plains. *Journal of Archaeological Sciences* 13:119-145.
- Nickel, Robert K.
 1974 *Plant Resource Utilization at a Late Prehistoric Site in North-Central South Dakota*. Unpublished Master's thesis, Department of Anthropology, University of Nebraska, Lincoln.
- 1977 The Study of Archaeologically Derived Plant Materials from the Middle Missouri Subarea. In *Trends in Middle Missouri Prehistory: A Festschrift Honoring the Contributions of Donald J. Lehmer*, edited by W. R. Wood. *Plains Anthropologist Memoir* 13 22(78), Part 2:53-58.
- 1988 Botanical Remains from the Lower Grand (1969 season) and Walth Bay (1970 Season) Sites. In *Archeological Investigations in the Mobridge Area, South Dakota, 1969-1970: Lower Grand (Davis), 39CO14; Walth Bay, 39WW203; and Helb, 39CA208*, by Carl. R. Falk and Stanley A. Ahler, Appendix C. American Archaeology Division, Department of Anthropology, University of Missouri, Columbia. Submitted to National Park Service, Rocky Mountain Region, Denver. Contract Nos. C3452(69) and C3501(69).
- Nowak, Timothy R.
 1981 Lithic Analysis of the Oakwood Lakes Site (39BK7), Brookings County, South Dakota: A Woodland Period Stone Tool Assemblage of the Northeastern Prairie Periphery. In *Archaeological Excavations at 39BK7, Brookings County, South Dakota*, edited by L. A. Hannus, pp. 51-152. Contract Investigations Series 33. South Dakota Archaeological Research Center, Rapid City.
- Olsen, Stanley J.
 1960 *Post-Cranial Skeletal Characters of Bison and Bos*. Papers of the Peabody Museum of Archaeology and Ethnology, Harvard University 35(4). Peabody Museum, Cambridge, Massachusetts.
- 1964 *Mammal Remains from Archaeological Sites Part 1 - Southeastern and Southwestern United States*. Papers of the Peabody Museum of Archaeology and Ethnology, Harvard University 56(1). Peabody Museum, Cambridge, Massachusetts.
- 1968 *Fish, Amphibian and Reptile Remains from Archaeological Sites. Part 1 - Southeastern and Southwestern United States*. Papers of the Peabody Museum of Archaeology and Ethnology, Harvard University 56(2). Peabody Museum, Cambridge, Massachusetts.
- Parmalee, P. W.
 1979 Inferred Arikara Subsistence Patterns Based on a Selected Faunal Assemblage from the Mobridge Site, South Dakota. *Kiva* 44(2-3):191-218.
- Peterson, J. E., II
 1980 *Seasonal Exploitation of Fish Resources in the Middle Missouri Subarea*. Unpublished Master's thesis, Department of Anthropology, University of Nebraska, Lincoln.

- Pozarnsky, T. H.
1969 Vegetation on the Lower Grand site (39CO14), July 17, 1969. Site Files: 39CO14.
- Semken, Holmes A., Jr.
1976 Descriptive Analysis of Rodent and Insectivore Cranial Elements Collected from Helb, Lower Grand and Walth Bay Sites, Oahe Reservoir, South Dakota. Submitted to the National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1983 Holocene Mammalian Biogeography and Climate Change in the Eastern and Central United States. In *Late-Quaternary Environments of the United States, Volume 2, The Holocene*, edited by H. E. Wright, Jr., pp. 182-207. University of Minnesota Press, Minneapolis.
- Semken, Holmes A., Jr., and Carl R. Falk
1980 Holocene Climatic Changes in the Northern Plains of the United States: The Mammalian Record. *Abstracts of the 38th Plains Conference*: 37-38. Iowa City.
1987 Late Pleistocene/Holocene Mammalian Faunas and Environmental Changes on the Northern Plains of the United States. In *Late Quaternary Mammalian Biogeography and Environments of the Great Plains and Prairies*, edited by Russell W. Graham, Holmes A. Semken, Jr. and Mary Ann Graham, pp. 176-313. Illinois State Museum Scientific Papers, Vol. XXII. Springfield, Illinois.
- Semken, H. A., Jr., and R. L. Foley
1979 Small Mammal Distributions in Four Plains Village Sites. *Abstracts of the 37th Plains Conference*: 29. Kansas City.
- Sigstad, John S., and Joanita Kant Sigstad (editors)
1973 *Archaeological Field Notes of W. H. Over*. Research Bulletin Number 1. South Dakota State Archaeologist. Department of Education and Cultural Affairs.
- Smith, C. S., and R. L. Jantz
1972 *Skeletal Material from the Walth Bay Site, 39WW203*. Submitted to National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Stephenson, R. L.
1954 Taxonomy and Chronology in the Central Plains-Middle Missouri River Area. *Plains Anthropologist* 1:15-21.
1971 *The Potts Village Site (39CO19) Oahe Reservoir, North Central South Dakota*. Missouri Archeologist 33.
- Strong, W. D.
1933 Studying the Arikara and Their Neighbors on the Upper Missouri. *Explorations and Field-work of the Smithsonian Institution in 1932*: 73-76. Smithsonian Institution, Washington, D.C.
- Torres, Victor R. Pacheco, Alfredo Altamirano Enciso and Enma Guerra Porras
1986 *The Osteology of South American Camelids*. Archeological Research Tools 3. Institute of Archeology, University of California, Los Angeles.
- Tucek, Charles S.
1977 Radiocarbon, Ltd. Natural Radiocarbon Measurements II. *Radiocarbon* 19(2):245-262.

- Vehik, S.
1971 Pollen analysis at the Lower Grand site, 39CO14. Site Files: 39CO14.
- Warren, R. K.
1972 A Study of Mussel Remains from South Dakota Archeological Sites. *Abstracts of the 82nd Annual Meeting of the Nebraska Academy of Sciences*, Lincoln, Nebraska.

1973 Freshwater Mussel in Prehistory. *Abstracts of the 83rd Annual Meeting of the Nebraska Academy of Sciences*, Lincoln, Nebraska.
- Weakley, W. F.
1971 Wood from sites 39WW203 and 39CO14. Ms. on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Wilmeth, Roscoe
1958 *Report of the Investigation of the Payne Site 39WW302 Walworth County, South Dakota 1956*. Archaeological Studies Circular No. 8. State Archaeological Commission, Pierre, South Dakota.
- Winham, R. Peter
1989 39CO14 Washing and Cataloging Collections. Archeology Laboratory, Augustana College, Sioux Falls, South Dakota. Submitted to U.S. Army Corps of Engineers, Lake Oahe Office, Pierre, South Dakota. Contract No. DACW45-88-M-K701.
- Winham, R. Peter, and L. Adrien Hannus
1991 *South Dakota State Plan for Archaeological Resources*. Archeology Laboratory, Augustana College, Sioux Falls, South Dakota. Submitted to South Dakota State Historical Preservation Center, Vermillion. Grant-in-Aid No. 46-90-50121.05.
- Winham, R. Peter, W. Raymond Wood, and L. Adrien Hannus
1994 *Archeological Sites of the Middle Missouri Trench Village Cultures A.D. 1000- A.D. 1887 with a Focus on the Antecedents, Development, Spread, Influences, Achievements, Climax and Decline of the Mandan, Hidatsa and Arikara Cultures in North and South Dakota*. Archeology Laboratory, Augustana College, Sioux Falls, South Dakota. Submitted to South Dakota State Historical Preservation Center, Vermillion. Project No. 46-93-80053.003.
- Woolworth, Alan R., and W. Raymond Wood
1964 *The Demery Site (39CO1), Oahe Reservoir Area, South Dakota*. Smithsonian Institution, Bureau of American Ethnology Bulletin 189:67-138. River Basin Surveys Papers No. 34. Washington, D.C.

APPENDICES

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